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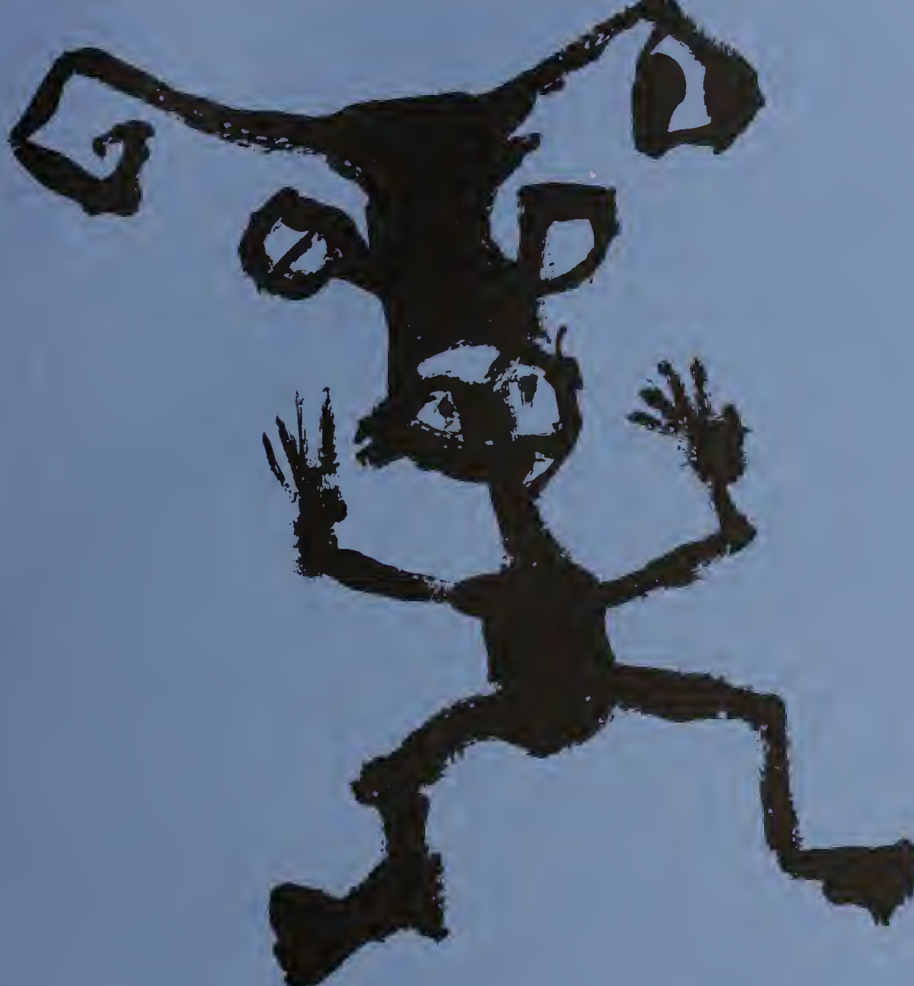

ARCHEOLOGICAL INVESTIGATIONS IN WEST-CENTRAL NEW MEXICO

VOLUME 1: REPORT OF THE FIRST FIELD SEASON

Eileen Camilli Dabney Ford Signa Larralde

CULTURAL RESOURCES SERIES NO. 3, 1988

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Introduction to Volumes 1-3

The New Mexico Bureau of Land Management's Cultural Resources Management publication series will be greatly enhanced by the release of this three volume set, titled Archeological Investigations in West-Central New Mexico. This current report evaluated the range and significance of cultural resources located in a specific geographical area which may be affected by coal mining. A final decision on whether or not to approve coal mining in this area will not be made until the mid-1990s.

The cultural resource investigations addressed two basic areas of inquiry. The first concerned archeological remains. Were there either any single complex sites or dense concentrations of sites whose mitigation costs may be so great as to render coal development unprofitable for a given lease tract? The Bureau sought to provide industry with accurate data concerning the costs of completing inventories and data recovery within different zones of the San Augustine Coal Area.

The second subject investigated concerned historic cultural resources. The American Indian Religious Freedom Act mandates that federal agencies consider the effects of planned undertakings on the ability of Indians to practice their religion within the project area. In addition, historic documentary resources were investigated and ethnographic interviews conducted because on the ground identification and evaluation of historic archeological sites are difficult to perform accurately.

Taken as a whole, the three volumes successfully accomplished the tasks for which they were designed. We can now predict, for example, that there are no single huge complex sites for which data recovery would be prohibitively expensive. At the same time, Kayser and Carrol point out in Volume 3 that, when taken as a whole, the density of sites within the moderate coal production area examined by this study is approximately three times higher than the average in New Mexico. More importantly, when individual coal leases are drawn up, data provided in these volumes will allow for a rough calculation of the types and densities of prehistoric and historic archeological remains within a particular lease tract.

Much more was accomplished by these studies than merely complying with legal mandates governing planning for federal coal leasing. The three volumes published here, in addition to providing data critical to analyzing the environmental impact of such an undertaking, make solid contributions to the general body of anthropological knowledge in west-central New Mexico. Detailed descriptions have been presented on the various ways archeological materials have been

categorized into "functional" site groups and how these categories relate to patterns in the context of inventoried assemblages. The strengths and biases of archeological and historical methodologies used to identify and evaluate cultural resources are revealed and compared. Detailed syntheses of ceramic studies offer a comprehensive scheme for classifying ceramic materials for this region of New Mexico.

To the credit of the authors, limitations of these studies and methodological weaknesses are freely admitted and openly discussed. The difficulties in sustaining long-term research projects in the federal government resulted in some inconsistencies in approach between the inception and conclusion of this project. Readers should note that the first chapter of the third volume discusses how data were collected under an evolving research design. The strength of the results and its limitations for statistically valid predictive modelling should be kept firmly in mind.

Limitations aside, the release of this three volume set provides a wealth of new information about a poorly documented region of New Mexico. Located between the better known Mogollon cultural tradition to the south and west and the Anasazi tradition to the north, the complexity and richness of cultural resources in west-central New Mexico are only now being appreciated.

Stephen L. Fosberg
and LouAnn Jacobson,
Series Editors

San Augustine Coal Area

Archeological Investigations In West-Central New Mexico

Volume 1: Report of the First Field Season

by

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Bureau of Land Management
Las Cruces District
Socorro Resource Area

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Bureau of Land Management archeologists Chris Kincaid and John Roney developed this project and designed and initiated the survey sampling designs for 1983 and 1984. BLM's Socorro Resource Area Archeologist, Charles H. Carroll, persevered to complete the survey in 1985. Digitization of the survey area stratification and map production was performed by Jane Farmer, Socorro Resource Area. Barbara L. Daniels edited Volumes I and II and is to be thanked for her tremendous patience in waiting to receive the typed manuscripts. Alice Martinez, Barbara Gutierrez, and Leah Padilla of the Socorro Resource Area typed the manuscript and are also to be thanked for their efforts in producing the endless numbers of tables in Volumes 1 and 2. Carol Cooperrider and Matthew Schmader drafted the maps and figures.

Production of this series is to be credited to Stephen Fosberg, BLM New Mexico State Archeologist, who coordinated this effort and contributed valued and needed assistance. LouAnn Jacobson, Assistant State Archeologist, and Marilu Waybourn, writer/editor for the Farmington Resource Area, worked to transform an otherwise long and complicated manuscript into a readable one.

Abstract

From June 1983 until April 1, 1984, the Socorro Resource Area in the Las Cruces District of the Bureau of Land Management conducted an archeological survey and reconnaissance within the San Augustine Coal Area (SACA) in west-central New Mexico. The work was done in conjunction with analyses of the impacts that would occur as a result of the selection of alternatives for public lands that would be acceptable for inclusion in the federal coal leasing program.

This report describes the cultural and historical resources lying primarily within three cultural resource inventory areas within the SACA. A total of 303 archeological and historical site proveniences reflecting a very intensive and complex history of use of the region were recorded.

The archeological survey data comprise a six percent sample of cultural resource inventory areas as well as a record of all known large architectural sites within the SACA.

In this volume, data are presented in studies of ceramic, lithic, and architectural variation among prehistoric site locations and evaluated with models outlining several occupational histories that could be applied to archeological sites.

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Chapter 1

Introduction

Intensive archeological survey and reconnaissance of the San Augustine Coal Area (SACA) were undertaken in 1983 and 1984 by the Socorro Resource Area in the Las Cruces District of the Bureau of Land Management. Located in west-central New Mexico, the SACA comprises approximately 450,000 acres in northern Catron and southern Cibola counties north of the town of Quemado and south of Fence Lake, New Mexico (Figure 1.1). Cultural resource surveys were initiated to determine which lands within the SACA were acceptable for inclusion in the federal coal leasing program. Under a maximum production alternative, 121,521 acres of federal coal within the SACA would be considered for further tract delineation; a moderate production alternative considered 34,271 acres of federal coal (USDI BLM 1984). Cultural resources were recorded by an archeological reconnaissance in the form of a widely-spaced transect survey covering 10 sections and a 10 percent sample of 40-acre quadrats selected for intensive archeological survey from within three cultural resource inventory areas (Figure 1.1). Transect and quadrat surveys focused on lands most of which are encompassed by the area considered under a moderate production alternative.

This report describes surveyed archeological resources within the Moderate Production Area and known historical resources within the entire SACA. Data recovered by archeological in-field recording procedures form the basis for description of patterned variation in site assemblages and for analysis of occupational histories of archeological sites (this volume). Historic sites recorded by the archeological quadrat survey were studied using oral histories and ethnohistoric documentation enabling comparison of in-field recording techniques with the actual use-histories of historic sites (see Volume 2, Kelley 1988). Goals of both analyses are to demonstrate the complex use-histories of places used in the past and the need for survey data acquisition techniques which will intensively document resources at the time of their discovery as well as during later stages of field research.

Physiographic Setting

The SACA is situated within the Datil Section of the Colorado Plateau on the Mogollon Slope. The Mogollon Slope is the structural unit on the southern part of the Colorado Plateau composed of sedimentary strata which dip gently to the south. The major topographic features in this unit are due mainly to volcanic rock which overlies the older sedimentary rocks (Fitzsimmons 1959:115). Within the archeological survey areas Mancos shales and Mesaverde Group sandstones are overlain by volcanic rock of Tertiary age and Quaternary basalt. Differential erosion of these sediments has resulted in a landscape characterized by sandstone and shale escarpments and basalt-capped mesas.

Late Cretaceous continental sedimentation is represented by the Mesaverde Group consisting of interbedded sandstone, siltstones, mudstones, claystones, and shales. A purple and red zone of oxidized sandstone averaging 90 feet thick is stratigraphically situated within the uppermost portion of the Mesaverde Group. The Baca Formation, a red bed sequence of sandstones, conglomerates, claystones, and mudstones (Johnson 1978)

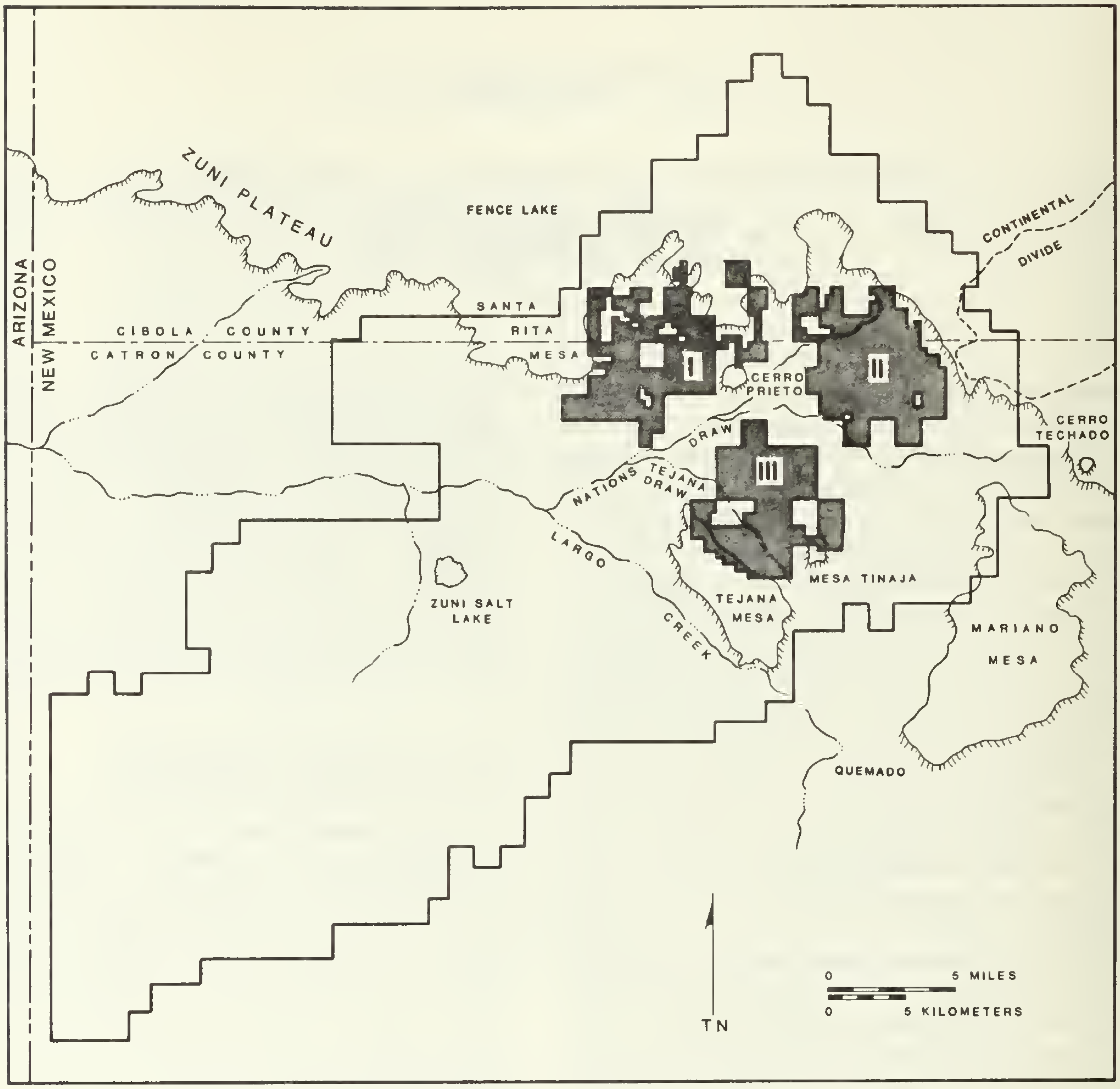


Figure 1.1: Cultural Resource Inventory Areas Within the SACA

overlies the Mesaverde Group strata. Baca mudstones outcropping to the northwest of Mesa Tinaja have yielded clay samples suitable for ceramic production. Together these units form the mesas, buttes, low benches, and knolls ringing the bottomlands.

Mariana Mesa and the uplands along the Continental Divide are capped by later volcanic wackes, claystones, and sandstones and often by basalt conglomerates. Elsewhere, thick basaltic lavas of possible Pliocene and Quaternary-Tertiary origin cap mesas and buttes; the preserved thickness of the older basalts range from five to 50 feet on Tejana Mesa. Basalt blocks and boulders from these lavas and from older basalt conglomerates form talus deposits on mesa slopes. The broad bottomlands between ridges and hill slopes are filled with late Pleistocene to Holocene alluvial deposits of unconsolidated sand, gravel, and mud.

Centered between Inventory Areas I, II, and III is Cerro Prieto, a topographic prominence whose volcanic caprock has resisted erosion. Surrounding this feature is a broad expanse of bottomland filled with Quaternary alluvial sediments through which flow ephemeral

drainages. Bottomlands that average 6,600 feet in elevation are flanked on the south, east, and west by mesas with steep vertical scarps and on the north by smaller mesas and ridge systems at the base of uplands reaching elevations of 7,600 feet on and west of the Continental Divide. Mariana Mesa on the east, Tejana Mesa on the south, and Santa Rita Mesa on the west are three such major features. Maximum elevations on these mesa scarps reach 7,400 feet. Draining the area bounded by these features are Nations Draw, Tejana Draw, and French's Arroyo, some of the easternmost watercourses in the region drained by the Little Colorado River.

Soils formed in alluvium characterize swales and drainageways with slopes of less than five percent. Rolling hills and fans in inventory areas are also distinquished by deep, well-drained soils formed in alluvium. On bedrock-controlled plains and mesas in the uplands soils are formed in residuum, derived dominantly from interbedded shale and sandstone, and in volcanic ash and cinders over residuum. Soils on the slopes of mesas, canyons, and intrusive dykes are formed in colluvium and alluvium from mixed sources.

Vegetation supported by alluvial sediments in bottomlands includes grasses, annual forbs, and mixed grassland-shrub communities. Major grass species in shortgrass and midgrass vegetation types (USDI BLM 1984) are *Bouteloua gracilis*, *Sitanion hystrix*, *Sporobolus airoides*, and *Agropyron smithii*. Vegetation types dominated by rabbitbrush (*Chrysothamnus nauseous*) and fourwing saltbush (*Atriplex canescens*) intermixed with grasses and snakeweed (*Gutierrezia sarothrae*) occur along drainageways.

In the northeastern portion of the study area at the base of the mesa scarp following the Continental Divide an open piñon-juniper woodland of *Pinus edulis* and *Juniperus monosperma* occurs. Piñon-juniper woodland, characterized by a canopy cover ranging between 15 and 60 percent, is found on the upland drainage divides. The understory here can be sparse or moderate with a diverse species composition. Major understory shrub species on uplands are snakeweed and mountain mahogany (*Cercocarpus montanus*).

Within the SACA area the frost-free period ranges from about 100 to 130 days depending on elevation and averages 120 days (Tuan et al. 1973:Figure 38). Quemado, at an elevation of 6,879 feet, experiences the last killing frost about June 7 and the first killing frost around September 24, the growing season averaging 109 days (Maker et al. 1972). A mean maximum temperature of 66 degrees Fahrenheit and mean minimum temperature of 26 degrees F. have been recorded for the 28-year period prior to 1960 at Quemado (Maker et al. 1972). Precipitation occurs mainly during summer months with moisture arriving from the Gulf of Mexico in the form of localized, high intensity, short duration thunderstorms. Average annual precipitation varies from about 12 to 15 inches with growing season precipitation averaging seven inches (USDI BLM 1982b).

Previous Archeological Studies

Accurate assessment of the types of archeological remains and their distribution in the SACA cultural resource survey areas, based on previous work, is difficult, even though many archeological survey and reconnaissance projects have recorded sites within the Quemado region. Previous work presents problems due either to its unsystematic nature or its restricted location. Early surveys were in the form of unsystematic reconnaissance along restricted topographic features, while later, more systematic efforts focused on transects or corridors outside the present study areas. Recent work as well as earlier work has attempted to identify components of past systems through reconstructions of past behavior based directly on site content without an evaluation of the cumulative histories of "sites" in this region, the surface manifestation of which consists of continuous overlays of artifact, structure, and feature distributions.

Initial archeological work in the Quemado region was conducted by Harvard University's Peabody Museum (Brew and Danson 1948) in the summer of 1947 (Upper Gila Expedition), during reconnaissance of 13 areas in east-central Arizona and west-central New Mexico. Examination of ceramics at sites in the Pie Town-Adams Diggings-Salt Lake Area, which

coincides with approximately the eastern two-thirds of the SACA, enabled Brew and Danson to offer an initial temporal classification of materials within this region. The recognition that gray and brown ware ceramics occurred together in surface ceramic assemblages within the region presented problems for recently formulated cultural-historical frameworks, since previously devised chronological sequences had been based on associations of gray and black-on-white wares or of red and brown wares. These problems were further discussed in subsequent studies from the perspective that intercultural relationships of some sort were structuring the archeological record at sites in the Quemado region.

The identification of the exact nature of the relationships between the Anasazi and the Mogollon, thought to be represented by different ceramic wares, was seen as dependent upon the accumulation of further information through intensive reconnaissance and excavation during the succeeding years of the Upper Gila Expedition.

During 1949, 75 square miles were surveyed in conjunction with the Upper Gila Expedition excavations near Mariana Mesa. This reconnaissance succeeded in locating and recording 157 sites in the Mariana Mesa area (Danson 1957:4). Survey was concentrated along the upper reaches of Nations Draw in areas north, east, and west of the northern one-third of Mariana Mesa. Reconnaissance was also undertaken along Largo Creek to the northwest of Tejana Mesa and on the volcanic plug that Bullard (1962:5) was later to name "Cerro Colorado." Based on this work, Danson offered a listing of sites in chronological order. The ceramic assemblage composition extended from pre-Pueblo I-IV.

Seven sites were selected for excavation in the Mariana Mesa area. With one exception (UG486) consisting of highly eroded cobble foundation alignments, excavation centered on adobe or masonry roomblocks. A majority of the locations were dated ceramically to late Pueblo II (A.D. 1000-1100) and Pueblo III (A.D. 1100-1300) times. In addition, the Williams site (UG636) located approximately seven miles south of Quemado on the eastern side of the valley of Largo Creek was excavated in 1951 by Watson Smith as a part of the program of the Upper Gila Expedition.

The Cerro Colorado site was excavated in 1953 and 1954 under the direction of J.O. Brew. Four main groups of architectural features at this site were intensively investigated by the Upper Gila Expedition (Bullard 1962). In all, 15 pithouses were excavated during the 1953 and 1954 field seasons. Dates obtained from tree-ring samples were published in 1970 by the Laboratory of Tree-Ring Research (Bannister et al. 1970). Berry (1980:156) notes that the tight clustering of tree-ring dates, from well-controlled proveniences, makes the Cerro Colorado site one of the best dated sites in the Southwest. The majority of dates from the site clustering within a restricted period indicate that most construction activities took place between A.D. 626 and 675 (Berry 1980:756).

Subsequent to the investigation of the Quemado region by the Upper Gila Expedition, surveys undertaken by a variety of agencies, institutions, and private corporations from 1960 to 1980 concentrated on relatively restricted corridors through the SACA. Architectural sites were located and recorded on or near State Road 117 in conjunction with the Wetherill Mesa Project, sponsored by the National Park Service (Winkler 1961). The objective of this project, to locate architectural features and ceramics similar to those of the Mesa Verde area in southwestern Colorado, was not realized within the study area. Eleven sites were inventoried along State Road 117 and State Road 36 between Quemado and Fence Lake by the Museum of New Mexico as a part of the inventory of cultural resources undertaken jointly by the New Mexico State Highway Department and the Museum of New Mexico. These sites include several containing masonry pueblos which had been previously recorded by the Upper Gila Expedition. During the summer of 1963 archeological reconnaissance was undertaken along the route of an underground trans-continental communications cable across central New Mexico from border to border (Hammack 1964). Three proposed Tucson Gas and Electric Company transmission line corridor routes were also surveyed through the westernmost portions of the SACA between 1972 and 1978 by Wilson

(1972, 1976, 1978). To the south of the study area proper the nearest systematic survey and excavation has been undertaken along New Mexico State Highway 32 beginning about seven miles south of Quemado and ending at Agua Fria Creek. Between 1972 and 1976, 27 sites were located within the Largo Creek valley and a single site on Agua Fria Creek (Kayser 1973, 1976).

The only reported excavation, in addition to the work of the Upper Gila Expedition (McGimsey 1980), is Barnett's (1974) excavation of the Sandstone Hill Pueblo (NA11,233). The site is located on the Hubbell Ranch approximately 22 km north of the town of Quemado in the foothills of the Continental Divide. Excavation of the 18 room pueblo, an adjacent ramada, and a burial located in the vicinity of the pueblo was undertaken in 1971. The pueblo consists of a linear alignment of square and rectangular simple masonry rooms with a maximum depth of three rooms. The maximum dimension of the largest room does not exceed 3.5 m. Occupation of the site has been ceramically dated to between A.D. 1115 and 1300 (Barnett 1974:1). Both brown and gray utility wares occur in the ceramic assemblage with decorated wares making up the highest proportion of items (Barnett 1974:32).

Recent surveys for private corporations have concentrated in the northeastern portion of the SACA in Ranges 15W-17W. Surveys of drilling areas and access routes conducted by the Office of Contract Archeology (OCA) and the Division of Conservation Archaeology (DCA) located and recorded 76 sites in 1982 and 1983. In all, three separate surveys were undertaken by OCA (Eck 1982; Elyea 1983; Hogan 1983, 1985) and a single survey by DCA (Moore et al. 1983). The data recovered by this set of surveys constitutes a major source of information concerning site location, distribution, size, and period of occupation for areas which are within a four-mile radius of the confluence of French's Draw and Nations Draw. The DCA survey area extends outside this radius another four miles east.

Surveys for the Salt River Project conducted by Eck (1982) and Hogan (1983, 1985) centered on the 6,400 acre Fence Lake coal lease area. Cerro Prieto lies just to the north of the lease boundary and Tejana Mesa to the south. The confluence of French's Draw with Nations Draw occurs in the central portion of the lease area. Eck's survey centered around drill hole locations and road rights-of-way; later the projects (Hogan 1983, 1985) involved quadrat and block surveys within the same lease area. Elyea's (1983) survey concentrated on drill hole locations and access roads in a 7,100-acre addition to the original lease area. Survey areas were located adjacent to all but the northeastern boundary of the original lease area. This survey area covers the talus slopes and ridges at the northern tip of Tejana Mesa and the upland ridges and tributary drainage valleys bordering major lowlands to the north and south of the confluence of French's and Nations draws. The DCA survey was located in similar areas with the addition of sites in the upper reaches of French's and Lee draws at the base of the Continental Divide.

The types and proportions of features and components recorded for these surveys are generally similar; however, several exceptions should be noted. These exceptions involve different criteria for identifying Archaic components and the location of pithouses by the Elyea survey. Archaic sites were recorded in all surveys. The designation of an Archaic component was based on the presence of projectile points similar in style to those recovered from pre-A.D. 400 occupations elsewhere in New Mexico and Arizona. In addition, both Elyea and Hogan relied on the presence of bifacial reduction debris in lithic assemblages to indicate Archaic occupations. In contrast, an Archaic designation was applied to lithic scatters by Eck (OCA survey) and Moore (DCA survey) only if the appropriate projectile point types were present in an assemblage. The absence of sites containing pithouse features in all but the areas surveyed by Elyea may be related to the more frequent occurrence of these features in upland settings. A major portion of most lease areas is characterized by lowland valleys, while most of the Elyea survey area is located in the uplands. Since all but one of the surveys was organized around point or transect specific survey areas rather than randomly distributed sample areas, it is not possible to assess accurately the differences in the proportions of feature types among them.

A 1979 Class II survey by the University of Tulsa (USDI BLM 1979) focused on a randomly selected 10-percent sample of the Quemado Planning Unit. In terms of the area surveyed and number of sites recorded, it is the largest single survey within the SACA. The survey was designed to retrieve a representative sample of archeological remains from 61 sections, the sample to be distributed on the basis of a soil associations stratification. Thirty sections, most of which are concentrated in the western two-thirds of the study area in Ranges 18W-21W, were surveyed. Components representing occupations designated as Paleo-Indian, Archaic, Anasazi, Navajo, and Unknown were located. As with previous surveys, the majority of components recorded were given a Pueblo II period designation (A.D. 900-1100). Relatively high percentages of Pueblo II-III occupations were also documented (USDI BLM 1979). Common features present at Archaic components are lithic scatters and hearths. Features at later prehistoric occupations include artifact scatters, middens, mounds, jacal structures, masonry structures and roomblocks, and hearths.

Prior to the present survey, archeological reconnaissance was implemented in areas peripheral to the present cultural resource inventory areas by the San Augustine Coal Project in order to develop management plan recommendations. The reconnaissance, in the form of a transect survey, was designed for rapid evaluation of large areas and for detection of monumental architectural remains. Ten sections, a majority of which are situated to the west of Tejana Mesa along Largo Creek, were surveyed at 200-meter intervals. Transect inventories contain a total of 36 archeological sites and 47 isolated artifacts (USDI BLM 1979). Artifact, feature, and site environmental data at these locations are integrated into the studies presented here.

Known Sites Inventory

Sites recorded during the course of the previous archeological fieldwork in the SACA include 506 locations recorded by the Museum of New Mexico's Laboratory of Anthropology Archaeological Records Management System (ARMS). Most of the locations occur in the northeastern portion of the SACA or adjacent to the cultural resource Inventory Areas I, II, and III. They include all sites located and recorded during the course of reconnaissance and quadrat survey undertaken to date by the San Augustine Coal Project. Neither the sites described by Danson (1957:4) nor those described by McGimsey (1980) in the Mariana Mesa area and along Largo Creek are included in the ARMS listing, unless subsequently recorded by another institution.

There were 637 components identified at previously recorded sites (Table 1.1) on the basis of artifacts, features, and structures representing temporally discrete occupations. Prehistoric archeological cultures, thought to be represented by these components, have been characterized within broad time ranges, i.e. PaleoIndian, Archaic, and Anasazi. Historically, site use has been attributed to modern, ethnically distinct occupants of the study area, i.e. Navajo, historic Pueblo, Hispanic, and Anglo groups.

Table 1.1: Previously Recorded Site Components in the SACA

Culture	Frequency	Percent
PaleoIndian	2	.30
Archaic	81	12.72
Anasazi	361	56.67
Mogollon	9	1.41
Navajo	1	0.16
Anglo	20	3.14
Hispanic	5	0.78
Historic Pueblo	1	0.16
Other	1	0.16
Unknown	156	24.49
TOTAL	637	

The designation of sites to PaleoIndian and Archaic occupation categories is tenuous for a number of reasons. Sites are thought to have been used during PaleoIndian times due to the presence of fragmentary parallel-sided dart points in two of the lithic assemblages; however, the morphology of these bifaces does not necessarily conform to projectile point styles from securely dated pre-5000 B.C. contexts. In addition, since they are fragments, a complete repertoire of morphological attributes of each artifact cannot be examined.

The present inventory of recorded sites contains 81 locations which have been assigned to a pre-A.D. 500 category. Projectile point styles which include those identified for the Cochise culture (Haury 1950; Sayles and Antevs 1941) and the Oshara tradition (Irwin-Williams 1973) have been used as chronological indicators for sites and assemblages. In recent years a number of additional criteria have been used to place sites and assemblages into early portions of the chronological sequences of New Mexico and east-central Arizona. These include the lack of ceramics in assemblages, the presence of a high frequency of formal tools (facially flaked implements) in lithic assemblages (Eck 1982), the lack of hammerstones and groundstone implements in tool assemblages (Wilson 1978) and the presence of a high proportion of bifacial reduction debitage in assemblages (Elyea 1983).

The absence or low frequency of hammerstones and grinding implements in tool assemblages has been noted by Wilson (1978) for sites in extreme west-central New Mexico and by Wendorf and Thomas (1951:11) for Concho complex assemblages in east-central Arizona to the west of the study area. Wilson and a number of other investigators (Irwin-Williams 1968:52; Longacre 1962:158, 160; Martin et al. 1962:132) have also noted the relatively high frequency of bifaces in assemblages. These implements include roughly flaked blanks or preforms as well as finely pressure-flaked blades. A number of bifaces classified as finished implements and bifacial blanks are illustrated by Wilson (1978:Figure 35) who notes that similar artifact forms are also associated with later Puebloan occupations.

Chronologies based on projectile point sequences derived from excavated contexts in the west-central New Mexico region have recently been criticized. Gossett (1984) reviews the tool assemblages at sites in the Reserve area noting that "Archaic" Chiricahua and San Pedro projectile points have been found in all stratigraphic levels including those containing ceramics. In addition, point types thought to be indicative of San Pedro and En Medio phases have been found associated with late Archaic period and ceramic occupations in both northern and southern New Mexico (Gossett 1984).

A number of different projectile point forms were identified by the Class II survey. These include Agustin, Chiricahua, San Pedro, San Jose, Jay, Bajada, Armijo, and En Medio (Basketmaker II) types (Quemado Planning Unit Class II Survey Site Files). Lithic assemblages yield these types in all combinations as well as in association with late period projectile point forms and ceramics. Given the confused state of projectile point chronologies and the fact that the absence of ceramics is not an adequate criterion for placement of assemblages into a pre-ceramic occupation category, much additional investigation is required for determining the character of Archaic period occupations and settlement systems within the study area (Berman 1979:18).

Because criteria thought to be diagnostic of Archaic occupations have been applied exclusively to undated surface assemblages within the study area, the value of projectile point and other criteria as chronological indicators has yet to be determined. Since there exists a potential for similar technological strategies to be employed within the context of different subsistence-settlement systems, it may be that present criteria used for culture and phase differentiations obscure rather than delimit early subsistence-settlement patterns within the study area. For example, lithic assemblages and point morphologies that appear to be similar may represent portions of a technology implemented in the course of particular resource procurement strategies irrespective of the adaptation. If assemblages defined as PaleoIndian represent the implementation of technological strategies by specialists as opposed to those of generalist foragers as posted for Archaic times, a number of dissimilarities with the content of Archaic assemblages could be expected. It may be that many PaleoIndian and Archaic assemblages identified within the study area are the archeological manifestations of planned vs. unplanned technologies, the use of which crosscuts adaptations thought to have characterized PaleoIndian, Archaic, and later Puebloan times. While it is not possible to extrapolate subsistence-settlement patterns from the few PaleoIndian remains recorded within the study area, an analytically based comparison of assemblages yielding projectile points stylistically similar to PaleoIndian types with assemblages yielding later

point styles would contribute much to understanding this issue.

The majority of previously recorded sites within the study area have been assigned to the Anasazi archeological culture. The Anasazi classification is based on the presence of certain decorated white and red wares and the presence of graywares in ceramic assemblages, as well as on architectural styles. In contrast, few sites have been given a Mogollon classification. A review of each of the nine sites assigned to a Mogollon occupation indicates that the ceramic assemblages and architecture at these locations are essentially indistinguishable from those of a majority of locations designated as Anasazi.

One reason for the application of Anasazi and Mogollon labels to similar ceramic assemblages may derive from the fact that a majority of the sites designated Mogollon were recorded in the 1960s and early 1970s when relatively little was known about variability in ceramic assemblage content within the study area. In these cases, the presence of brownwares in ceramic assemblages was initially thought to indicate occupation of the locations within the study area and of areas to the south by similar groups of people.

If diffusionist explanations for ceramic styles and those based on population migrations are discounted, the occurrence of ware "mixes" at sites becomes a problem that requires an alternative explanation. Recent analysis of ceramic samples from Cox Ranch Pueblo (LA 13681), which is listed as a Mogollon site in the ARMS inventory, has indicated, for example, that equal numbers of Anasazi graywares and Mogollon brownwares are present (Stuart and Gauthier 1981:163).

Local manufacture of both brownwares and graywares prehistorically raises the possibility for other, functional determinants for brownware and grayware proportions in ceramic assemblages. Stuart and Gauthier (1981:168-169) list a number of determinants for production of brown and gray wares. These include source clays, production technique, and type and quantity of fuel available to accomplish firing. The authors note that the patterned variability in ceramic assemblage content within the west-central New Mexico region must be documented prior to pursuing explanations for assemblage variation due to differences in the organization of ceramic technology. Documentation of this kind of variability has yet to be accomplished for the study area. In terms of traditional ceramic typologies, documentation of the range of variability in ceramic assemblage content would clarify the propriety of phase schemes based on ware and type proportions for describing archeological remains within the study area.

Numerous phase designations, primarily of the Pueblo II period (A.D. 900-1100), have been applied to sites or site components within the study area. The Red Mesa phase as understood for the Zuni, Acoma, and Puerco River culture provinces (Museum of New Mexico 1983:21-23) and the Reserve phase used to describe areas in southern Catron County, New Mexico (Berman 1979:44) have both been used as phase designations within the study area. These Pueblo II phases as well as the Pueblo III Tularosa phase apply to the most frequently occurring Anasazi components. The fewest sites or site components are listed for the Basketmaker III and Pueblo I periods (A.D. 500-700) and for the Pueblo III period (A.D. 1100 to about 1350).

Prior to 1983, relatively few historic sites and components were present in the site inventory of the area. The lack of attention to historic material during earlier archeological surveys of the area may in part account for the relatively low number of documented historic sites. The single "historic long-term" site listed in Museum of New Mexico site records is Zuni Salt Lake (see Volume 2). The single Navajo site listed was recorded by the San Augustine Coal Area reconnaissance survey and contains a sweatlodge attributed to a Navajo occupation. Native American, Hispanic, and Anglo occupations and historically used locations in the SACA are documented in Volume 2.

Chapter 2

Prehistory of the Quemado Area

Prehistoric remains from all known archeological cultures were identified for this portiôn of the Upper Little Colorado region and described in several cultural resource overviews. The San Augustine Coal Area covers the southeastern portion of Tainter's Southwestern Subarea, although the few sites recorded there are not directly addressed in his overview (Tainter and Gillio 1980). The Cultural Resources Overview, Socorro Area, New Mexico (Berman 1979) describes the history of work, site location, inferred demographic patterns, and the material culture of the Quemado Planning Unit. Portions of the coal study area north of State Highway 60, west of State Road 117, and south of the intersection of State Road 117 with State Highway 36 lie within this planning unit. Additional descriptive summaries of the regional archaeology are presented by Stuart and Gauthier (1981) and Marshall (1976).

PaleoIndian & Archaic Periods

Understanding general environments and potential prehistoric economies during PaleoIndian and Archaic times is important for interpreting archeological remains in the study area attributed to these periods. Between 9000 B.C. and 6500 B.C., New Mexico and most of Arizona were occupied by PaleoIndian groups (Irwin-Williams 1979). During this time a trend toward decreased effective moisture may have occurred throughout the Southwest and may have been reflected in a decreased occurrence of PaleoIndian remains in the eastern plains of New Mexico (Irwin-Williams 1979; Judge 1979). The earliest Clovis adaptations (9000-9500 B.C.) were characterized as having a generalist or broad spectrum subsistence strategy by which a variety of megafauna was exploited (Judge 1979).

About 8500 B.C. and 6500 B.C. climatic fluctuations in the Southwest are paralleled by an increase in the frequency of sites attributed to the Folsom complex and by an increase in the extent of the distributions of sites attributed to Folsom and Cody complexes (Irwin-Williams 1979). By about 8500 B.C. several species had become extinct, including mammoth that were exploited during earlier times. After this time conditions favorable to the exploitation of large herds of bison have been inferred by Irwin-Williams and Haynes (1970). At 8500 B.C. Folsom and later PaleoIndian groups are thought to have had a specialized economy adapted to a single genus, *Bison*.

Parallel-sided, straight-based dart point fragments thought to represent late PaleoIndian components have been recovered from several sites in the SACA. LA 37341 is situated at the base of a hill bordering the tributary valley on the south side of Nations Draw. LA 27227 is located to the west of Zuni Salt Lake in an area also yielding a variety of Archaic point styles. An additional site, LA 8066, located near Red Hill on the southern border of the study area, has yielded 12 projectile points described as "within the range of late PaleoIndian and early Archaic types; most are basally ground, are foliated in form, and have either concave or convex bases" (Honea 1969). Lithic materials at LA 8066 consist predominantly of small quantities of a yellow quartzite and a tan to off-white chert (Marshall 1976).

After about 6500 B.C. two Archaic manifestations, the Cochise, first described for

southeastern Arizona and southwestern New Mexico, and the Oshara, identified in northwestern New Mexico, have been reported for the Quemado region. The Cochise tradition (Sayles and Antevs 1941) known from sites in southeastern Arizona and southwestern New Mexico was interpreted as a hunting and gathering economy adapted to northwest Mexican environments (Dick 1965). Remains of the Sulphur Springs (7500 to 3500 B.C.) phase of the Cochise were recovered in association with bones of extinct fauna including horse, mammoth, bison, and dire wolf. At about 2000 B.C. materials characteristic of the Chiricahua stage (3500 to 1500 B.C.) appear in west-central New Mexico (Irwin-Williams and Haynes 1970:67). These include tools which represent "a well developed groundstone assemblage dominated by shallow basin milling slabs and cobble manos" (Irwin-Williams 1979:67). Remains of the later Cochise period, termed the San Pedro phase (1500 to 200 B.C.) are thought to reflect considerable population expansion, reliance on horticulture, and continuous local shifts in settlement pattern (Irwin-Williams and Haynes 1970).

The stages of the Oshara tradition have been given similar interpretations with respect to trends in the subsistence economy and include the Jay complex (5500-4800 B.C.); Bajada complex (4800-3200 B.C.); San Jose complex (3000-1800 B.C.); Armijo complex (1800-800 B.C.); En Medio complex (800 B.C.-A.D. 400); and the Trujillo complex (A.D. 400-600) (Irwin-Williams 1973). Irwin-Williams (1973:5-6) notes that a broad spectrum of subsistence activities is responsible for much of the early Oshara sequence. In the Arroyo Cuervo area of northwestern New Mexico, the earliest practice of maize agriculture was dated between 1800 and 800 B.C. Reliance on horticulture, seasonal storage of foodstuffs, and increasing seasonal differentiation among sites mark Late Archaic occupations after 800 B.C.

Ceramic Periods

Longacre (1962) recognized several major changes in the Archaic adaptive system at approximately A.D. 275 in the Upper Little Colorado region. These changes include the beginnings of agriculture, domestic architecture, use of storage facilities, and settlement patterns indicative of relatively permanent locations of habitation. Among the major traditions or archeological cultures distinguished at this time in the Southwest, the Mogollon, centered in the mountainous areas of the Mogollon Rim country of Arizona and New Mexico, and the Anasazi of the Colorado Plateau have been described for the Upper Little Colorado region.

The study area was viewed as "transitional" between Anasazi and Mogollon culture areas (Danson 1957). Traditionally, the recognition of separate archeological culture areas has been an outgrowth of tailoring chronological sequences to clusters of similar material attributes within relatively restricted regions. The mixing of traits that characterize separate areas presents unexpected, and unexplained, variability in the archeological record when viewed with a culture area or normative model. Explanations of changes observed in the archeological record which are based on the concept of culture areas logically involve several possibilities: (1) individual or idiosyncratic behavior contributes to change in the material culture of a group; (2) movement of groups with different social patterns into an area may be responsible for more radical rates of change in material culture; and (3) in some cases, only contact need be made among groups for the introduction of ideas and cultural products into a system to occur.

While accepting that shared ideas, population movements, and norms did exist in the past, these factors are no longer viewed as explanations of archeological phenomena in and of themselves. Rather, a major problem focus is the explanation of the patterned variability that results from the formation of the archeological record itself. Since many, if not most, archeological sites may represent composite distributions of debris from separate occupations that are widely spaced in time, spatial concentrations of materials traditionally termed "sites" cannot be viewed as representing discrete episodes of activity, e.g. campsite, processing site, habitation, etc. The interpretation of the archeological record, thus, necessitates questioning the historical composition, or occupational history, of archeological distributions commonly recog-

nized as "sites." In asking such questions the implication is that the functions and historical composition of field-recorded archeological sites are largely uninterpretable with a standard trait list approach. Since interpretations cannot be based solely on the spatial association of items, the problem of using inferred temporal clusterings of site attributes is especially applicable to areas like those in the SACA that were subject to intensive prehistoric use.

The following review of pithouse and pueblo occupations summarizes the published data concerning excavated and surveyed sites in four general occupation periods. Two more specific chronological classifications were applied to the area and will be referenced. Berman's chronological sequence (1979) is made up of four periods: the Formative from A.D. 1 to 900; Pueblo II from A.D. 900 to 1100; Pueblo III from A.D. 1100 to 1300; and Pueblo IV from A.D. 1300 to about 1600. A Pecos classification of Basketmaker through Pueblo stages applies when relative dates are assigned to sites based on ceramic type inventories.

Occupation Period 1

Period 1 includes early and late pithouse occupations, i.e. Berman's Formative period and Basketmaker II through Pueblo I periods in the Pecos classification. Excavated sites in the study area include Cerro Colorado (LA 25894) (Bullard 1962) and UG486 (McGimsey 1980). The pithouses at Cerro Colorado are situated on the summit and lower slopes of the south side of a butte which rises 200 feet above the surrounding landscape. Cerro Colorado tree-ring dates place the majority of the construction activities at the site between A.D. 626 and 675 (Berry 1980:156), although cutting dates range from A.D. 604 to 687. Berry has summarized the pithouse architecture from Bullard's (1962) description as follows:

> Shape and size: Virtually the whole gamut of house shapes occurred at the site including round, oval, D-shaped, and rectangular with rounded corners. Circular to oval examples varied from 5.0 to 7.1 m in diameter with a mean of 6.1 m. The two D-shaped houses (Structures 402 and 405) were 4.7 m along the greatest transverse measurement parallel to the flat side of the "D" ... The rectangular houses ranged from 3.2 to 7.3 m in length and from 2.9 to 5.3 m in width ...
>
> Depth: These were true pithouses ranging, in depth from 0.6 to 2.0 m, with a mean of 1.3 m.
>
> Floors: The most common type of floor was unaltered native earth or bedrock. Two structures had clay plaster floors.
>
> Firepits: Firepits were circular to oval in plan.
>
> Other floors features: Additional floor features included post holes, partitions, storage bins, floor cists, heating pits, and deflectors.
>
> Entryway/antechamber: Three of the houses ... lacked both antechambers and vent shafts and had no discernible means of entry. These were presumably entered through the roof. The rest of the structures had either trenched entryways, trenched entryways connecting the main portion of the structure to an antechamber, or a ventilator shaft and tunnel.
>
> Benches: Four of the houses had benches ... Benches varied in width from 0.5 to 1.2 m and in height from 0.65 to 0.75 m (1980:161-165).

Although the locations of early pithouse villages in west-central New Mexico and east-central Arizona were described as elevated landforms (Berman 1979:30), Basketmaker III pithouse locations in the SACA do not lie exclusively on high inaccessible ground. Other sites attributed to the later part of the early Formative period (A.D. 500 to 700) in the SACA include artifact scatters and two pithouse villages located during early archeological surveys of the area (Museum of New Mexico Site Files). In addition to the above sites, a large, multiple pithouse site originally described by Bullard (1962:7) was relocated by the San Augustine Coal Project. Designated Site 335 by the present project, it is situated on a series of low benches above the confluence of two

of low benches above the confluence of two drainages. Ten to 20 pithouse depressions were observed on low benches above the drainages at this location, in association with a sparse artifact distribution. Twenty to 30 pithouse depressions and a dense surface artifact distribution were found on the upper benches. Three spatially discrete roomblocks, each consisting of three to six rooms of basalt cobble construction, were also observed on the westernmost finger of the second bench above the floodplain. The pithouse features were dated ceramically to Basketmaker III (A.D. 500-700) and the roomblocks to Pueblo I (A.D. 700-900). The Museum of New Mexico site records list five components for the Pueblo I period within the study area. Sites recorded by Danson (1957) for the Pueblo I period (A.D. 700-900) include sherd areas, jacal units, and small boulder pueblos of from two to six rooms. Danson places the majority of the site locations on ridges where many have undergone considerable erosion. This is the case for Site UG486, which consisted of highly eroded concentrations of lava cobbles representing house foundation alignments; the site was excavated by the Upper Gila Expedition (McGimsey 1980:286). Cobble alignments at this site were severely eroded. Occupation of the structures was placed by McGimsey between A.D. 850 and 900 (1980:268). Occupation of LA 4032, described by Wilson (1972) as a series of slab-lined surface rooms, pithouses, and six scattered masonry rooms, is also placed in this period (Stuart and Gauthier 1981:163).

Occupation Period 2

Danson (1957:70) described 138 sites which were occupied either wholly or in part during A.D. 900 to 1100. Sites attributed to this period are densely distributed on benches and ridges along main and tributary valleys. Bullard (1962) names Largo Creek, tributaries of French's Draw and Nations Draw, and areas around the base of Mariana Mesa as places where surveyed Pueblo II sites were found. Single and multiple-room masonry units are common features of Pueblo I-II and Pueblo II sites. Danson (1957) describes the majority of sites as averaging two to five rooms of basalt masonry construction. Larger sites contained units of from six to 20 rooms with an average of slightly fewer than 10 rooms.

Excavated pueblos include UG601 and UG188. UG601 is a single row of masonry rooms in a U-shape with a large circular depression located 21 m to the northeast of the unit. McGimsey (1980:250) places occupation of the site between A.D. 1000 and 1100 based on the presence of Red Mesa and Escavada Black-on-white, the principal painted types. UG188 is a unit of two rectangular jacal structures. A single tree-ring specimen and the presence of Red Mesa Black-on-white occur in the ceramic assemblage (McGimsey 1980:259).

The impression from early survey data of the period A.D. 900-1100 is one of densely distributed, small to moderate-sized masonry pueblos; however, site data from Marshall's (1976) site inventory for the Quemado region and from the preliminary findings of the San Augustine Coal Project indicate that relatively large architectural sites in the region have been dated ceramically to Pueblo II times. These sites include Cox Ranch Pueblo, a 300-plus-room masonry pueblo with a walled plaza; Cerro Pomo Pueblo, a roomblock of 35-45 rooms, two large kiva depressions, and extensive midden deposits; LA 3918, a multiple story roomblock of 30-50 rooms and multiple kiva depressions; Site 331 (San Augustine Coal Area), a multiple-story roomblock, a masonry plaza/kiva, three discrete middens, and an extensive complex of earthworks (Figure 2.1); and LA 8072, a stone masonry roomblock of 50-plus rooms.

The Danson (1957) survey data do not include this type of architectural unit, in part because the large, architectural sites listed above were undetected by Upper Gila Expedition surveys which were concentrated in the Mariana Mesa area. In addition, monumental architecture may have been assigned by early surveyors to later periods of occupation based on architectural rather than ceramic criteria.

Another problem in inferring the period of occupation from architectural remains concerns distinguishing between Formative (Basketmaker III-Pueblo I) and later period occupations based on the presence of pithouse structures. Sites containing burned jacal scatters and surface evidence of multiple pithouses have been recorded in association

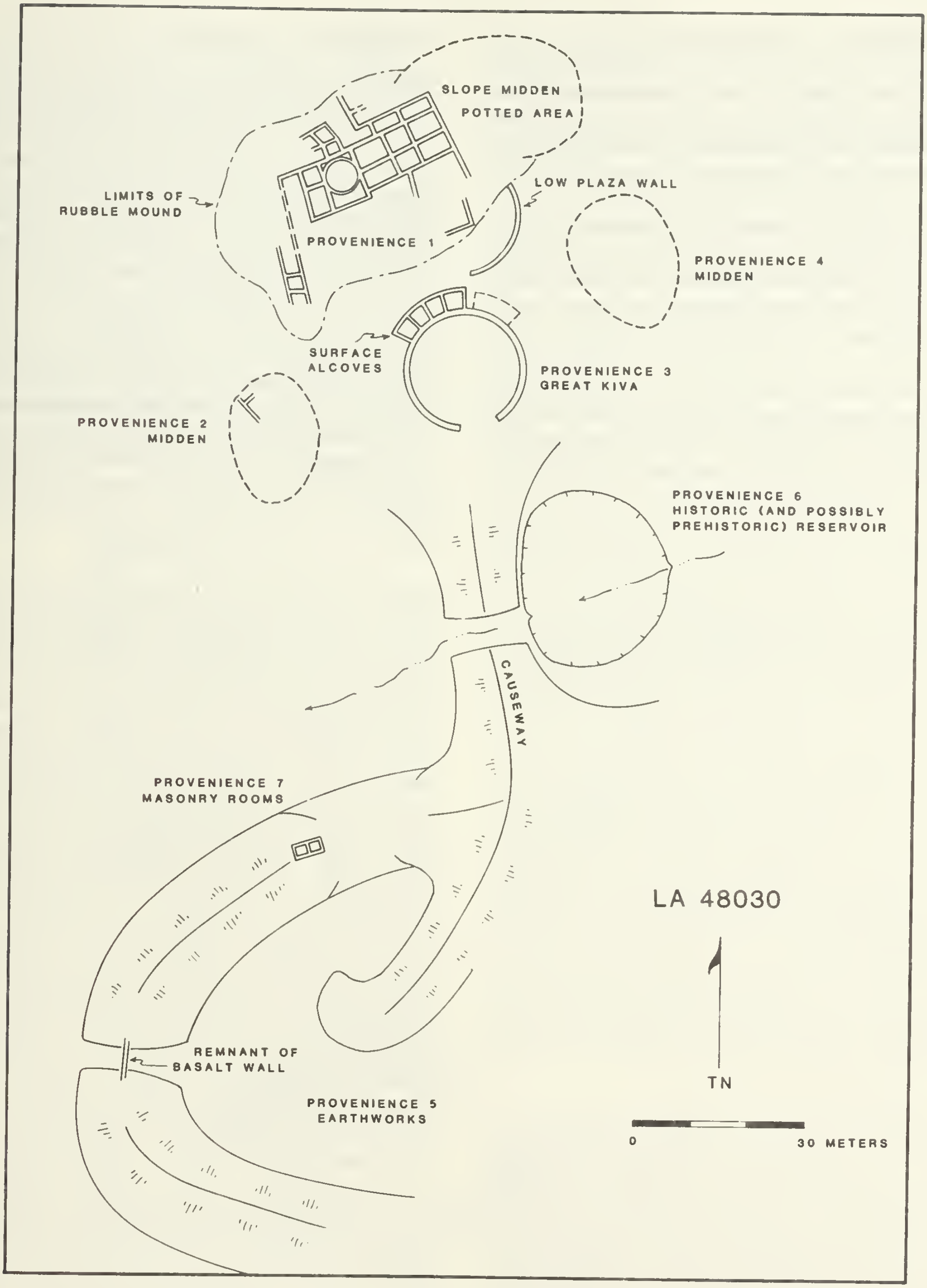


Figure 2.1: Complex of architectural units and features at LA 48030 (Site 331) with core and veneer and compound masonry roomblocks constructed of sandstone slabs, masonry, and jacal. The mounded earthwork construction at this site was not noted elsewhere in the SACA.

with ceramic assemblages indicative of occupations dating between A.D. 900 and 1300 in the study area. These associations may result from the complex occupational histories of places and from use of subterranean domestic architecture during later periods. McGimsey (1951:302) has reported on the excavation of three square pithouses at Site UG616, a 500- to 600-room Pueblo II-III pueblo, and presents evidence for the contemporaneous occupation of the pithouses and surface rooms.

Other excavation data from the Quemado region also point to problems associated with the use of architectural forms to assign occupations to particular time periods. Two occupations interpreted from excavated architectural remains at the Williams Site (Smith 1973) were dated to a period spanning the transition from the Three-Circle to Reserve phases or A.D. 900-1000 (Smith 1973:15). Incomplete tree-ring samples obtained from the excavation indicate dates of construction activity for pithouse rooms 11 and 15 sometime after A.D. 1012 (Bannister et al. 1970:17). Dated tree-ring specimens from a single masonry surface room, Room 4, place the construction date of this room at A.D. 1015 (Bannister et al. 1970:17). Of the 10 specimens submitted for dating from Room 4, six samples were assessed to have outside rings within a very few years of the cutting date or exhibited an outermost ring. Dates from these samples clustered between A.D. 1012 and 1015. If these samples represent separate beams and not portions of a single scavenged timber, then the dating of construction activities for Room 4 is relatively sound.

The similarity between dates obtained for pithouse and masonry structures brings into question the assignment of the pithouses and surface rooms to separate phases of occupation. Given the extremely close dates obtained from structural timbers in pithouses and surface rooms at the Williams Site, interpretations of the occupational history of the site might, for example, include construction of relatively temporary structures (pithouses) to ensure winter shelter in one season, followed by construction of permanent habitations (masonry rooms) in later seasons by the same residential group.

Occupation Period 3

Berman (1979:58) describes known locations of Pueblo II-III (A.D. 1050-1300) and Pueblo III (A.D. 1100-1300) period sites at Carrizo Creek, Largo Creek, and in the Mariana Mesa area. The pattern of site distribution during these times, as interpreted from Upper Gila Expedition surveys, is one in which later occupations tend to be located along the eastern tributaries of French's Draw and Nations Draw near the Continental Divide (Bullard 1962:7). Danson's survey recorded several classes of architectural sites: (1) small units composed of fewer than 10 rooms constructed of basalt cobbles; (2) coursed sandstone masonry units in L, rectangular, or U shapes; (3) multiple masonry units positioned around a large kiva depression; and (4) rows of masonry rooms situated around a square plaza.

Excavated sites that conform to these architectural and locational patterns include UG494, UG481, UG616, and UG143 (McGimsey 1980). UG494 consisted of two units each of which was composed of a double row of masonry rooms associated with a roughly rectangular subterranean structure located to the southeast of each unit (McGimsey 1980:227-247). The northern unit consisted of a unit of four rooms and an adjacent subterranean structure. Eight surface rooms and an associated subterranean structure comprised the southern unit. All structures were excavated in their entirety. Based on co-occurring ceramics types at Site UG494 and other excavated sites in the Mariana Mesa area, McGimsey (1980:229) estimates that occupation of the site occurred around A.D. 1120 and lasted for some 20 to 30 years. Site UG143 is represented by five spatially discrete, masonry roomblocks ranging in size from 12 to 50 or more rooms each. These units are arranged in a rough circle around a large depression measuring about 20 m in diameter. Three additional smaller depressions are located adjacent to the masonry units. Excavation of the large central depression revealed a circular floor with a ramp entrance to the south-southeast side (McGimsey 1980:173). Opposite this ramp were situated two rooms or walled areas connected to the floor of the central area with a masonry stairway. This feature is interpreted by McGimsey (1980:171)

as a central plaza designed for the public performance of ceremonial activities. Based on the ceramic assemblage, the entire site was estimated as occupied during the 1200s (McGimsey 1980:173). Site UG481 was a triple unit of 34 masonry rooms in an L-shaped ground plan with a kiva situated in the area enclosed by the wing of the L. Excavation focused on all or portions of the 34 rooms and the kiva. Outer-ring dendrodates range between A.D. 1248 and 1271 (Bannister et al. 1970:14). The Shipman Site, UG616, is the latest occupied pueblo documented in the region. Multiple rooms of adobe and jacal at this site enclose a large rectangular plaza measuring roughly 200 by 250 m. The plaza contained several all or partially subterranean rooms and a large excavation entered by an earthen ramp interpreted as a walk-in well. Dates provided by tree-ring specimens, ceramics, and architectural styles have indicated initial occupation around A.D. 1100 with occupation terminating about A.D. 1300.

Reconnaissance by the San Augustine Coal Project in northern tributary valleys of Nations Draw to the east of Santa Rita Mesa provides contrasts to locational and architectural patterns outlined for the Pueblo III period by Danson (1957). Extensive complexes of architectural features and locations containing large masonry roomblocks dated ceramically to Pueblo II-III and Pueblo III are found in this area (Figures 2.2a-2.2c). Rather than

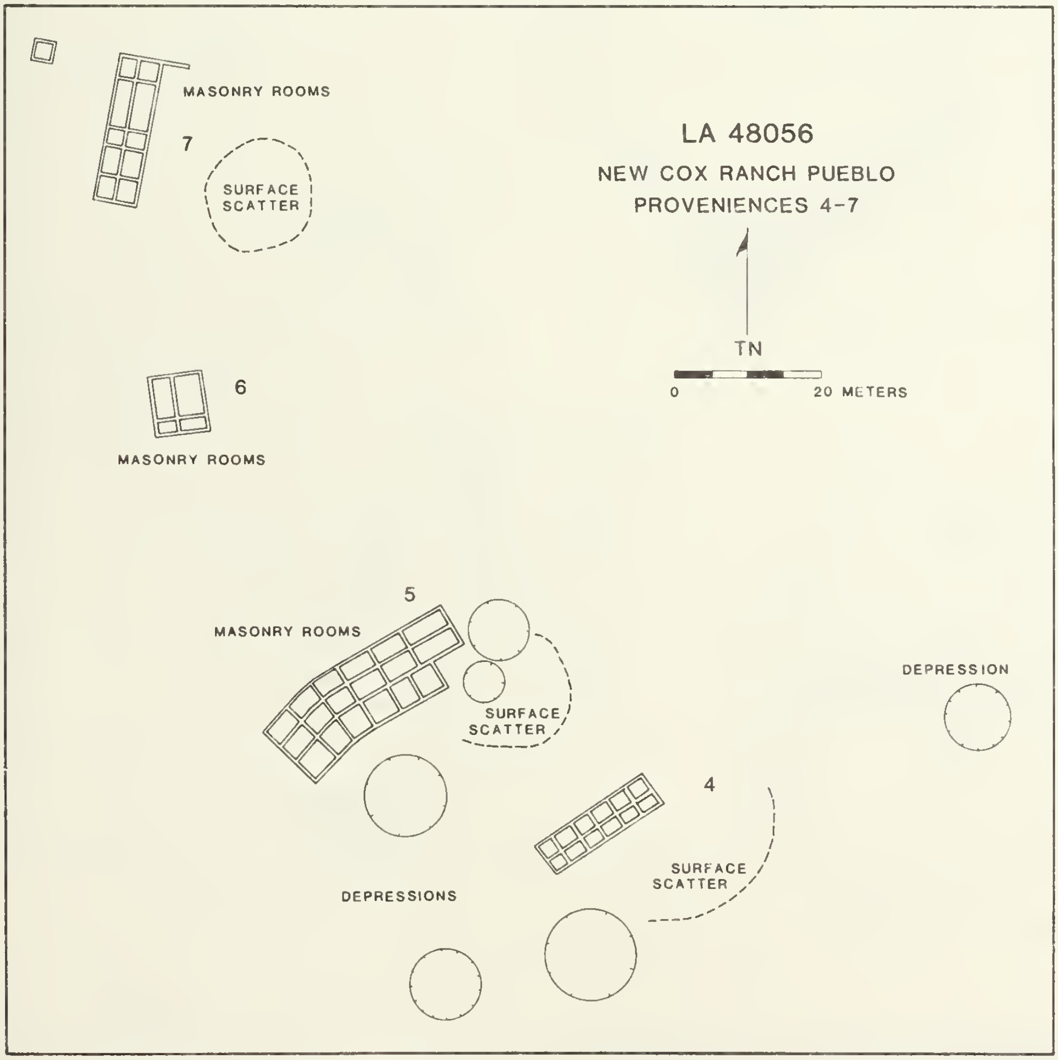


Figure 2.2a: LA 48056 (Site 472) — compound masonry structures of 4 to 10 rooms and associated features at proveniences 4, 5, 6, and 7.

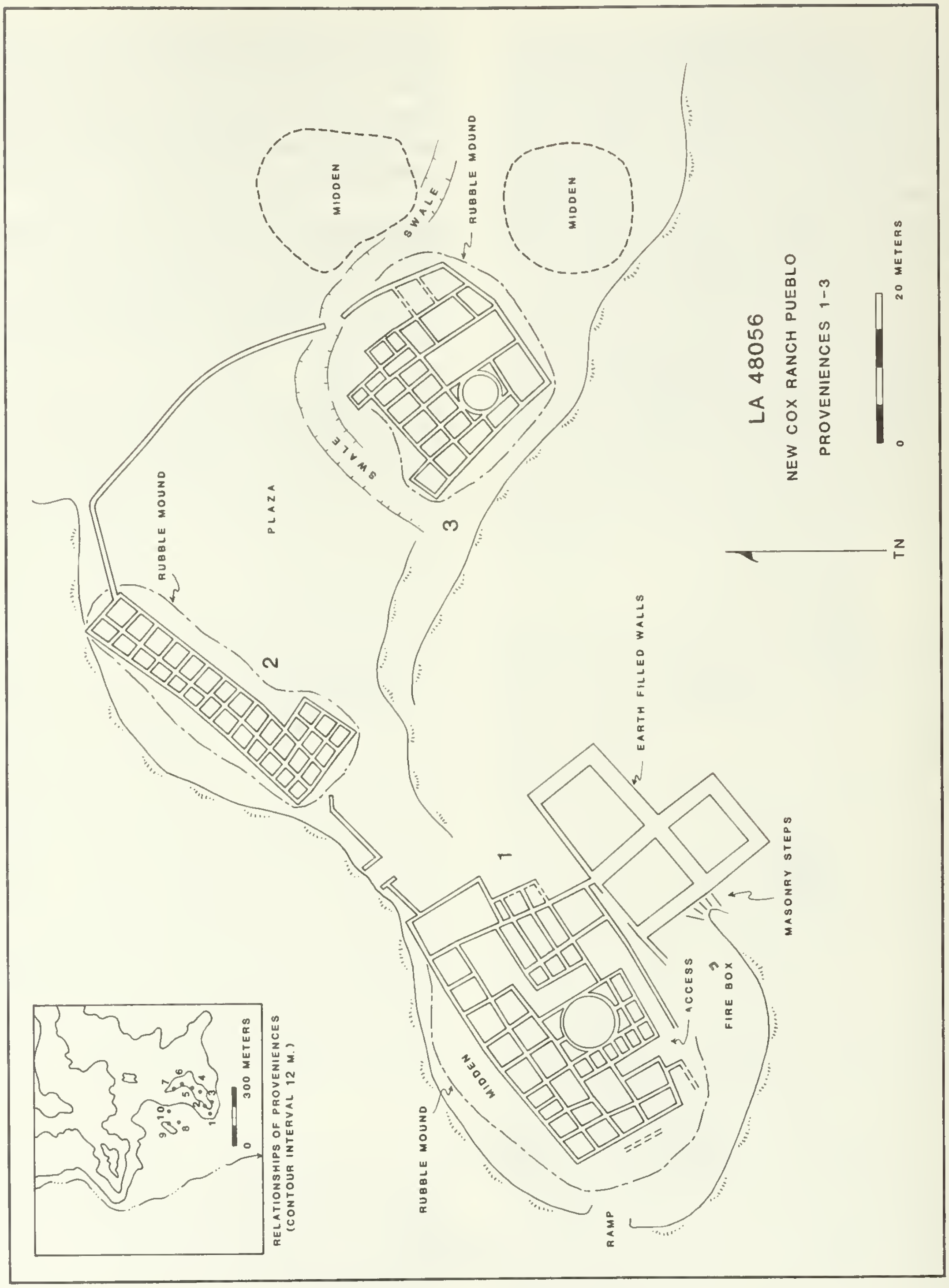


Figure 2.2b: LA 48056 (Site 472) — compound and core and veneer masonry roomblocks of 30 to 40 rooms at proveniences 1, 2, and 3.

being situated in the foothills of the well-watered Continental Divide, sites are located on ridge tops and isolated mesas surrounded by relatively barren aggraded valleys. An additional architectural pattern is evidenced by other sites in this area as well. Site 333 (Figure 2.3) which has yielded one of the latest ceramically-based dates in the area (D. Ford, personal communication 1984) is an example of such a pattern. Over 25 two to seven room, single story, sandstone masonry units at this site are densely distributed across an isolated mesa covering approximately 25 acres in area. The ceramic evidence suggests that while units may not have been contemporaneously occupied, all were utilized within a relatively brief time span.

Occupation Period 4

Danson (1957:74) refers to 25 sites which, on the basis of ceramic evidence, may have been occupied into the A.D. 1300s in the Mariana Mesa area. Three of these sites (190, 152, and 616) are large masonry or adobe quadrangles constructed around open plazas. Tree-ring specimens from Site 616 (Bannister et al. 1970:16) place the latest construction activities at this site sometime after A.D. 1286. There are no Pueblo IV period (A.D. 1300 to 1600) sites listed in the Museum of New Mexico's site records for the SACA, nor were ceramic complexes dated to this period discovered during the present survey.

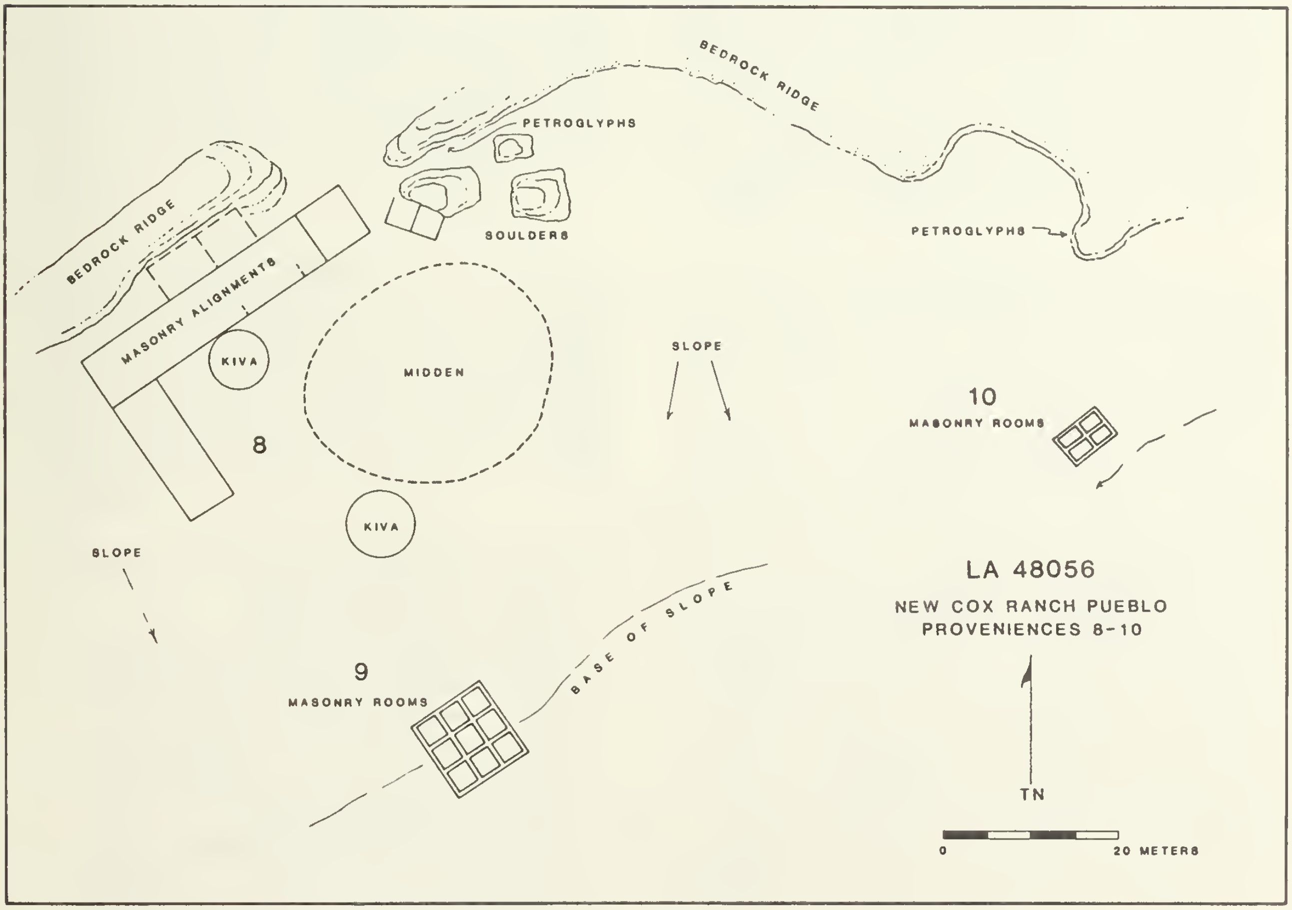


Figure 2.2c: LA 48056 (Site 472) — simple masonry and subterranean structures at proveniences 8, 9, and 10.

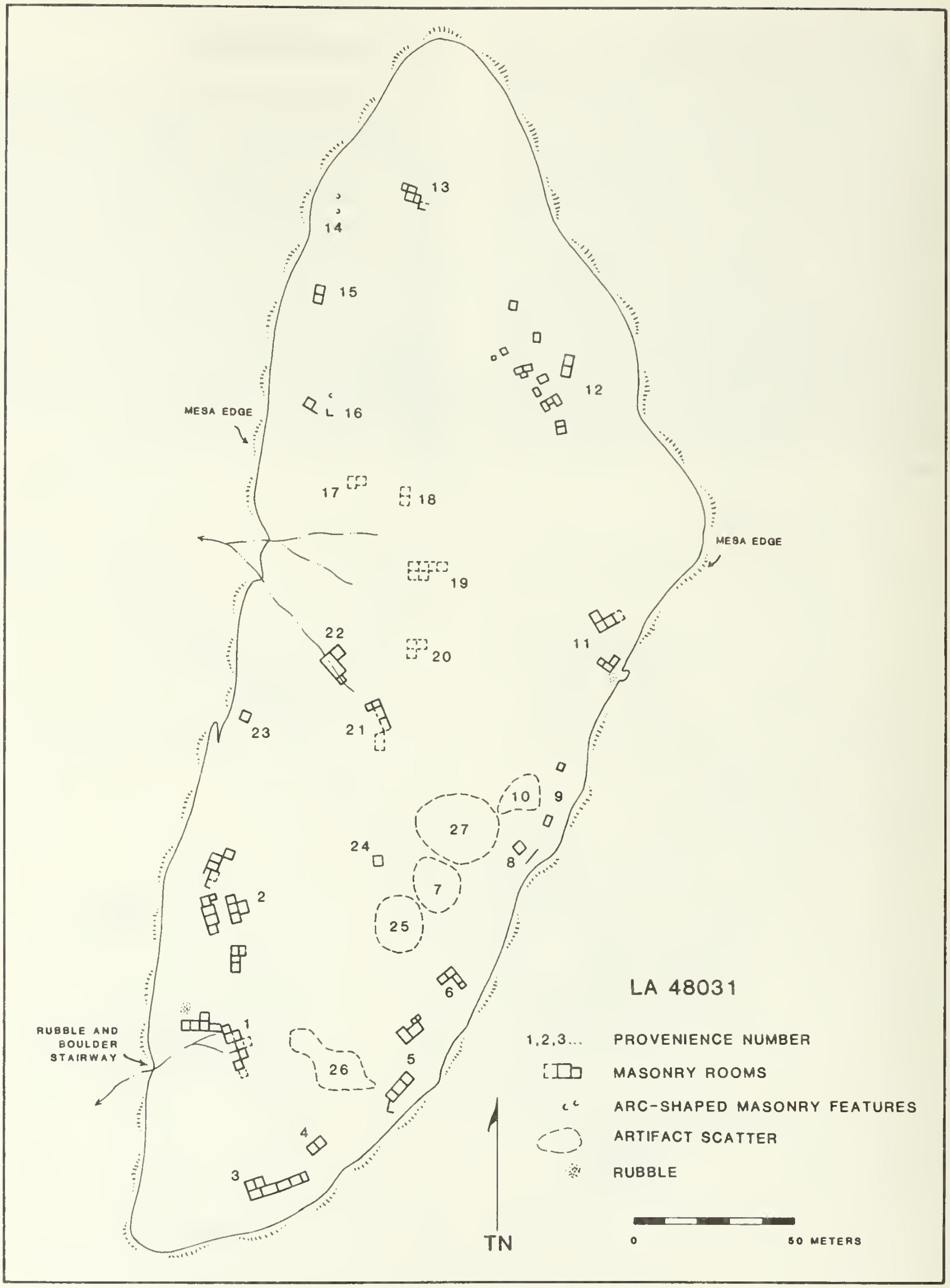


Figure 2.3: Rooms and small roomblocks on mesa top at LA 48031 (Site 333).

Chapter 3

Survey Procedures and Goals

This chapter reviews the process for selection of sample survey units within the SACA cultural resource study area. As part of this review, a topographic stratification of three survey areas designated Cultural Resource Inventory Areas I, II, and III is detailed and the sample selected for archeological survey described.

Field survey methods are outlined and the general objectives of in-field artifact recording procedures and subsequent analyses of recorded artifact, feature, and architectural data are discussed in the final section of the chapter.

Sampling Methods

Sampling is the careful inspection of a small amount of representative area for characteristics or parameters which are of concern, and which can later be projected to a larger area. The key term here, of course, is "representative."

As Ebert and others (1983b:1254) point out:

> Sampling ... allows the researcher to control explicitly for the many factors other than the actual resources that condition what is found during survey (e.g. vegetation cover, soil erosion, sun angle, weather, and the purpose of the survey) by accordingly adjusting sampling intensity and the parameters sampled ... an explicit sampling approach to cultural resources assessment can serve as a remedy to the use of uniqueness and site-size as significance-criteria by allowing concentration on the range of resources within areas sampled, rather than on an extensive search for the most "significant" sites in a large tract.

The reasons of sampling for archeological remains in the SACA are practical as well as advantageous for comprehensive data collection procedures. Obviously, sampling requires less manpower and enables data collection procedures to be carried out more quickly than would survey of the entire area; however, also important are the opportunities for more comprehensive, and controlled data collection procedures than would be possible with a total survey.

Standard sampling procedures begin with a sampling frame (Taylor 1977:74) in which objects to be sampled are placed in some type of specified order. In the case of archeological remains, the character of the target population, in this case surface distributions of artifacts and features, is largely unknown. Hence, sampling procedures entail not only the collection of information from archeological distributions, commonly referred to as "sites," but discovery of the sites as well. Map coordinates serve as the sampling frame for surveys, since it is area not archeological sites being directly sampled. In cluster or area sampling (Blalock 1960; Holmes 1967) samples consist not of elements, artifacts or sites, but of units of plane or 3-dimensional space (e.g., transect or quadrats) within which data collection procedures are concentrated (Judge et al. 1975).

Sampling of the archeological survey areas delineated for the San Augustine Coal Project

involves survey of randomly distributed 40-acre parcels within four topographically defined strata. Selection of 40-acre sample units was determined by logistical considerations, primarily by the feasibility of locating the units, travel time between sample units, and by the need to position survey areas within legally described land parcels whose boundaries are easily replicable. Forty-acre sample units are also more easily contained within topographic zone boundaries than are larger quadrats.

The result of a sample survey consists of sample estimates which are distinguished by two properties — accuracy and precision (Berry and Baker 1968:92). Accuracy refers to how closely sample estimates agree with a population value. Consistent over- or under-estimations result from biased sample estimates. A range of estimates around the actual population value is referred to as sample precision. Commonly, the results of the discovery phase of archeological survey are viewed as the main goal of a sample survey; however, without a second goal of intensive, controlled data collection procedures at sites, the utility of survey results will remain largely untestable. Testing for sample precision requires a data base from which population values can be estimated. In the case of archeological survey, the problems of estimation are compounded by the fact that the values archeologists wish to estimate are not directly quantifiable. These values are the properties of prehistoric systems, e.g. the number and type of activities carried out at locations and the function of a location in past settlement systems. As such, these properties are not directly observable and must be inferred from surface remains. Reliable evaluation of sample precision, therefore, requires analysis of data collected at sites and correct inference of what these data represent in terms of past systems.

Survey Area Stratification

Stratification procedures involve dividing the study area into subareas from which a number of small samples are in turn drawn to ensure that the highest possible sample precision is obtained from a distribution of sample units across the study area. Nonarbitrary or informed stratification enhances the sampling of nonrandom parameters and involves the presampling division of a population based on supplementary information in order that the parameter observed is more uniform within a stratum (Judge et al. 1975:89). As Judge and others (1975:89) point out, the gain in precision from stratified sampling is dependent on the magnitude of variation between stratum averages. Since under-sampling of internally diverse strata can seriously influence sample precision, strata should be devised to be as different as possible and to have the smallest internal variance as possible.

Three tracts within the SACA (Cultural Resource Inventory Areas I, II, and III) comprising approximately 43,000 acres were selected for archeological survey. Stratification of the survey areas relies on topographic variability within the survey tracts. Prior to initiation of the survey, a topographic stratification was designed by the Socorro District Office.

Although previous survey and reconnaissance of the SACA have indicated where some types of remains are more likely to occur than others, without an intensive survey the actual variability in archeological remains present in different topographic settings is unknown. This presents a problem for archeological sampling strategies since obtaining a representative sample requires that the variability of remains within strata be known in order to determine an adequate amount of area to be surveyed. Determining a proper sampling fraction is a fundamental problem with archeological sample surveys and has been recognized by Ebert and others (1983b:1254):

> One problem ... is, the proportion of the total area that must be surveyed in order to accurately model the total population. In practice and in the literature, sampling fractions ranging from 10% to 50% or more have been invoked, in no instance with much logical justification. Unfortunately, neither for random samples nor for the sorts of stratified samples discussed above, can a "proper" sampling fraction be determined. This is because there

is nothing against which the adequacy of a sample can be tested. Although several archaeologists have attempted to test a post-inventory sample against total-area site lists (Plog 1968; Judge, Ebert and Hitchcock 1975), purely inductive samples cannot be tested.

Thus, a presampling stratification of archeological areas can be justified only by a belief that the criteria used to stratify a survey area will be relevant to understanding the distribution of archeological remains in that area. Since the nature of the archeological record as seen by archeologists today depends as much on what happens to sites and materials after they are discarded as it does behavioral processes, topographic stratification can be justified in part through expectations for how post-depositional processes affect the visibility of archeological remains. Regional sequences of landscape, soils, and geological and geomorphological unit formation and alteration can reveal general expectable patterns of archeological visibility to which densities of surface remains may be referred. This generally appears to be the case in comparisons of topographic strata described below.

Topographic Strata

Four topographic zones were delineated within the survey area (Figure 3.1) by coal team personnel: Zone A, Isolated mesa and ridge tops; Zone B, Steep talus; Zone C, Foothills and

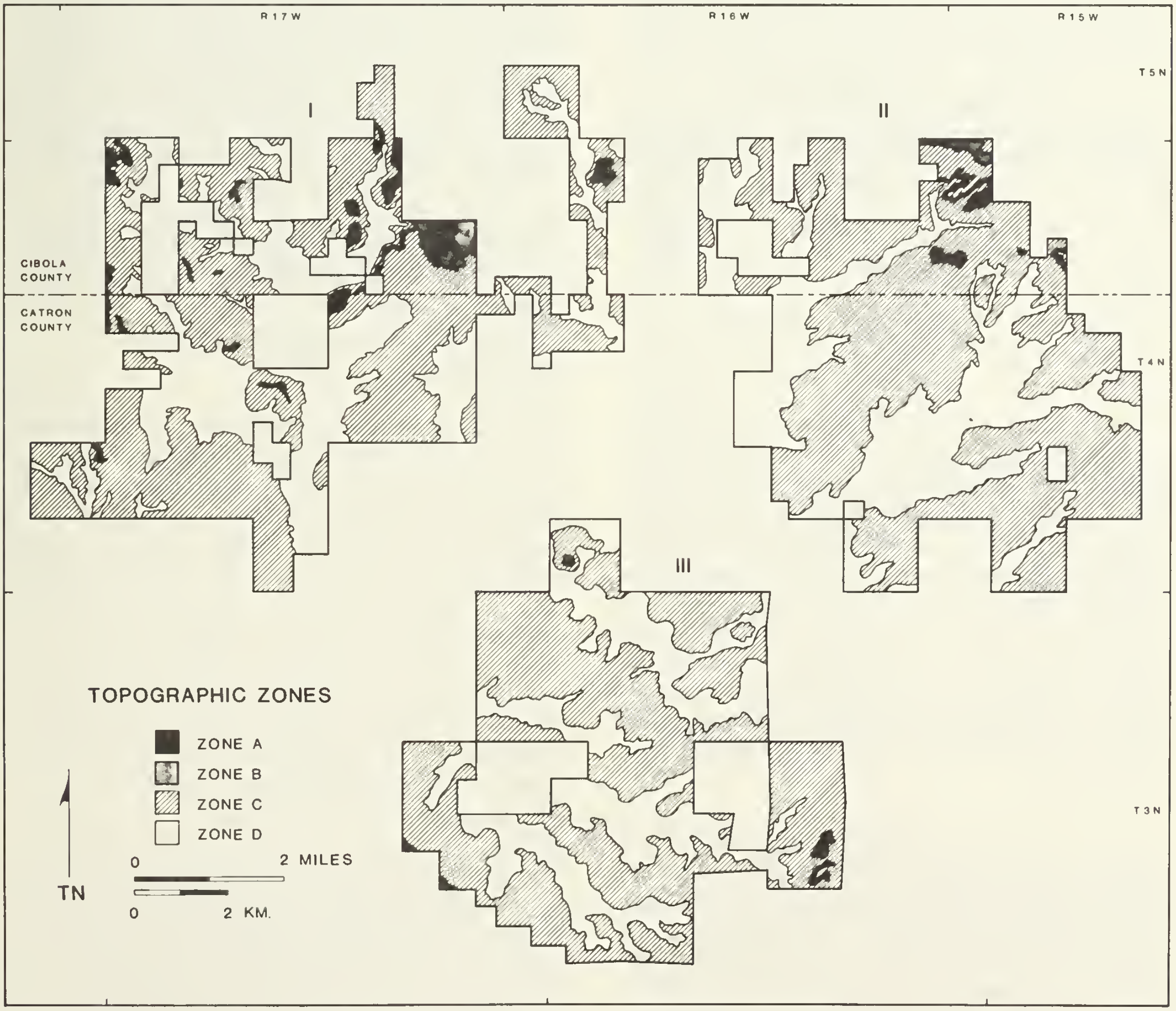


Figure 3.1: Topographic zones within the SACA cultural resource inventory areas.

ridges; and Zone D, Alluviated flats. Each zone was manually (visually) delineated on 7.5 minute USGS quadrangles.

Recognition of zone boundaries is directly dependent on map scale which, in this case, is 1:24,000. Visual interpretation has also resulted in generalized zone boundaries and the inclusion of small but different areas within large, homogeneous ones. This is not necessarily an unwanted result of a visual stratification, in fact it is desirable; if maps were not generalized to some extent they would be impossible to utilize in any practical way. The areas of each zone are listed in Table 3.1. Criteria for zone delineation relied primarily on differences in slope as measured by percent grade with a USGS slope indicator, and on landform.

Table 3.1. Acreage in Four Topographic Strata.

Topographic Zones	Acres	Percent
A	232	0.005
B	934	0.022
C	27,447	0.637
D	14,467	0.336
TOTAL	**43,080**	

➡Zone A:

This zone comprises elevated areas, relatively flat mesa tops or the tops of ridges and buttes, which are surrounded by steep talus. A very small portion of the inventory area, approximately 230 acres, is contained within this zone. Small, isolated mesas occur primarily in Inventory Area I and include a small mesa in the upper reaches of Pascual Draw, Flattop Mesa, and a series of smaller mesa tops in the upper reaches of tributary drainages to Nations Draw on the eastern border of Santa Rita Mesa as well as lower benches of Santa Rita Mesa itself.

In Inventory Area II isolated mesas and small buttes are located between the upper reaches of French's Draw and Long Canyon at the base of the Continental Divide. Inventory Area III contains the least amount of area in this zone with a small isolated mesa located in the alluviated valley of Nations Draw and elevated benches at the eastern end of Tejana Draw.

Soils in Zone A include those derived from mixed sources with soft calcareous sandstone at a depth of 12 inches. Vegetation in these areas includes blue grama, Indian ricegrass, needlegrass, muttongrass, mountain mahogany, piñon, and juniper. Other areas lacking vegetation include outcrops of unweathered basalt, sandstone, or tuff and sideslopes of unconsolidated volcanic sediments of soft shale.

➡Zone B:

Zone B comprises localized areas of relatively steep talus slopes characterized by a slope of 20 percent grade or greater. This zone includes areas surrounding Flattop Mesa and other nearby isolated mesas and areas on the eastern edge of Santa Rita Mesa, the northeastern periphery of Tejana Mesa, and at the heads of canyons at the base of the Continental Divide. Soils and vegetation are similar to those of Zone A. In Inventory Area II soils also include those formed in residuum, derived dominantly from basalt with basalt bedrock at a depth of 19 inches. Vegetation in these areas includes pine dropseed, Arizona fescue, mountain muhly, and sideoats grama in the understory. Present in the overstory are piñon, alligator juniper, oaks, and scattered ponderosa pine at higher elevations.

➡Zone C:

The topography of the majority of each inventory area is characterized by slopes between a six and 20 percent grade in this zone. This includes low ridge systems and rolling hills that separate all major aggraded valleys. Ridges and buttes in this zone are eroded remnants of late Cretaceous strata, soils derived from interbedded shales and sandstones. Blue grama, Indian ricegrass, western wheatgrass, and widely scattered one-seed juniper are included in parkland communities. Woodland's contain piñon, juniper, galleta, and bottlebrush squirreltail as well.

➡Zone D:

Areas characterized by less than a six percent grade surrounding main and tributary watercourses were designated Zone D; drainages include Nations and French's draws and their tributaries. Approximately one-third of the total inventory area, or 14,467 acres, is included in this zone. Soils in drainages are

formed in course and broad textured alluvium. Shrubs include rabbitbrush in upper and fourwing saltbush in lower reaches of the drainage valleys. Annual forbs dominate the low-lying areas.

The Selected Sample

Sampling naturally bounded topographic strata with legally defined sample units presents additional sampling problems since many 40-acre parcels will inevitably be situated over more than a single topographic zone. Deletion of these quadrats from the sample population would exclude a majority of the area within each inventory unit, thus a sampling design which takes multi-zone quadrats into consideration was used. Each sample unit was coded for zone and zone combinations and these tallied for all three inventory areas. Tallies of sample units in each zone or zone combination and number of units examined in order to achieve a 10 percent sampling fraction are listed in Table 3.2. In all, 110 sample units were selected for survey.

Table 3.2. Single & Multi-zone Sample Units in the Inventory Areas and the Selected Sample

Zone	Total Number Units	No. Selected Sample Units (10% rate)
A/B	3	1
A/C	11	1
A/C/D	8	1
A/B/C	14	2
A/B/C/D	14	2
B	1	1
B/C	39	4
B/C/D	7	1
C	335	34
C/D	534	53
D	107	10
TOTAL	**1073**	**110**

Sample units located within a single zone are comparable and can be used to evaluate the survey results statistically. Sample units that include variable portions of more than a single zone, while not similar with respect to the proportions of different kinds of topography they contain, can be delineated. Assessing survey results with these multi-zone units relies on site and provenience tallies by topographic zone, rather than by sample unit. This procedure enables survey coverage of the total inventory area and assessment of the archeological "sensitivity" of topographic strata through comparison with site parameters tallied by topographic zone as well as by single-zone sample units.

The actual acreage and percentage of each topographic zone to be sampled with the above outlined procedures are listed in Table 3.3. Total acreage figures differ slightly between Tables 3.2 and 3.3 because of the elimination of lots measuring fewer than 40 acres from the sampling universe as presented in Table 3.2. Approximately, 10 percent of the total acreage contained within the inventory areas was selected for survey. The sampling fraction for topographic Zones C and D is 10 percent. Zones A and B, however, were slated for sampling at a higher rate for the following reasons: first, since these zones are relatively localized as linear areas of talus or isolated mesa and butte tops, they are likely to occur in combination with other zones in a 40-acre survey quadrat. Most multi-zone quadrats in fact contain portions of either Zone A or B (Table 3.2); Secondly, since each zone is represented by a small amount of acreage within the inventory areas, selection of even a few quadrats containing portions of these zones results in a relatively high percentage of each in the sample.

Table 3.3. Zone Acreage in Inventory Areas and Selected Sample

Zone	Total Acres	Acres (%) in Selected Sample
A	232	56.6 (24.40)
B	934	129.5 (13.87)
C	27,447	2,816.0 (10.26)
D	14,467	1,397.9 (9.66)
TOTAL	**43,080**	**4,400.0 (10.21)**

Field Techniques

Survey methods involved field crews of three or four individuals walking parallel to each other across quadrats. Surveyors were spaced 20 m and 30 m apart, the spacing dependent on the topography and vegetation of sample units. Each sample unit was recorded using

a unit description form and sites were recorded using a Laboratory of Anthropology, Museum of New Mexico archeological site survey form (Appendix I). Site maps were sketched and all sites were photographed and tagged. All site locations were recorded on 7.5 minute USGS quadrangles. These include Fence Lake SW, Cerro Prieto, Techado, Mariano Springs, and Tejana Mesa quadrangles.

An in-field analysis of ceramic and lithic artifacts was accomplished for each recorded location. On-site analysis techniques and artifact and architecture recording formats are detailed in Chapters 5, 6, and Appendix II. General observations taken at sites were also coded as part of the site/architecture coding format (Appendix I). These observations include sample and provenience unit numbers, topographic zone, vegetation, and terrain categories as listed on the Museum of New Mexico site form, and provenience elevation, exposure, and size measured in square meters. In addition, the type and number of prehistoric and historic surface features present at each provenience were coded.

Research Issues

Major research issues involve identifying the functions, temporal placement, and occupational histories of archeological distributions, and are concerned with the nature of previously inferred adaptations within the region.

The following brief discussions consider the issues of recognizing the past use histories of places and interpreting past technological behaviors.

Recognizing Site Occupational History

The focus of archeological fieldwork in the Quemado region, as well as in the rest of the Southwest, has been the archeological site. A major criterion for identifying archeological sites with significant information potential has been site size, as measured by areal extent of scatter, amount of artifactual material, or number of structures and features at a location. The rationale behind the use of these site characteristics to decide which archeological remains have research potential is that larger sites are supposedly more likely to inform about prehistoric adaptations within a region (James et al. 1983). However, relatively large distributions of artifacts and features may represent spatial composites of debris which result from several temporally discrete occupations, making identification of the remains that represent specific adaptations or occupations difficult if not impossible.

An occupation is defined as "the uninterrupted use of a place by participants in a cultural system" (Binford 1982:5), and the purposes for which a place was used in the past and the number of separate uses of that place comprise its occupational history. It is the repetitive fashion in which groups locate their settlements and task-specific sites on a landscape that determines the occupational history of places, and can be this history, rather than a single episode of behavior, that determines the content of archeological distributions or sites.

Viewing sites in this way, criteria used to assign spatial composites of debris to particular prehistoric periods or to particular functional classes may prove to be unreliable indicators of both period of occupation and site function; that is, diagnostic materials may be spatially associated with other items which did not necessarily result from the occupations that produced those diagnostic items. Thus, the composition and structure of assemblages at many sites may not directly inform about individual occupations indicated by diagnostic criteria. The spatial association of functional and temporal criteria, in the form of artifact types and features, can be viewed, therefore, as an inadequate basis for assessing the function and period of use of many if not most archeological sites.

Temporally or functionally diagnostic materials at composite archeological distributions provide ambiguous evidence for the function of any single occupation contributing to the composite. With this problem in mind, one recourse would be to record and analyze artifact and feature distributions at an appropriate scale for identifying activity area or the simple activity area composites of a single occupation. The spatial scale necessary to represent the single activity episodes sug-

gested by recent analyses of ethnographic (Binford 1983; Camilli 1983; Nelson 1983; Yellen 1977) and experimental (Newcomer and Sieveking 1980) data is a relatively large one, relying on a maximum grid size of one-by-one meter. With the use of a systematic method for delineating spatial associations at this scale, many small, relatively discrete distributions of surface remains could be identified that are commonly included in far more extensive distributions of artifacts and features, termed "sites." The occupational history and composite character of artifact and feature distributions recorded as "archeological sites," is the focus of the present study.

Identifying and Interpreting Behavioral Strategies

A central concern for inferring temporal placement from stone tool production techniques as has been done for the Archaic, is the fact that production techniques as reflected in patterns of tools and debris may not demarcate particular prehistoric groups or time periods. Specifically, bifacial reduction techniques as represented by flake attributes may not necessarily be indicative of any particular archeological culture or temporal period. Production techniques may instead represent technological strategies that crosscut adaptational shifts from seasonally mobile to more sedentary settlement systems, as has been modeled for Archaic and Puebloan occupations in the study area.

The composition of some lithic assemblages, in particular those generated during the implementation of special-purpose activities such as hunting, may reflect something other than general systems within the region. While the importance of hunting or other special-purpose activities indicated by tool production technique may have changed during the prehistoric occupation of the region, the archeological manifestation of such special-purpose activities may not vary significantly through time. This possibility calls into question the assignment of sites to particular adaptations, cultures, or time periods on the basis of lithic production techniques and biface style criteria.

The issue of archeological phenomena as manifestations of strategies rather than adaptations is directly related to the interpretation of Archaic and Puebloan subsistence-settlement patterns within the SACA. If sites commonly identified as "Archaic" on the basis of inferred production technique and biface style criteria represent the remains of particular resource procurement strategies rather than particular adaptations, then there are several important implications for interpreting prehistoric subsistence-settlement systems within the Quemado region.

First, a class of remains which represents special-purpose activities could be systematically excluded from consideration as a component of later Puebloan settlement systems. Secondly, if only special-purpose activity locations are identified as Archaic, then residential components of early settlement systems within the region are going largely unrecognized. Identifying the full range of settlement types used in past systems first requires analytical procedures that distinguish among locations used for residential and nonresidential functions regardless of Archaic or Puebloan affiliations. This first step is not a straightforward task, since as mentioned by the above discussion, we are focusing on distributions of artifacts, features, and structures that are admittedly composites. Therefore, a major analytical goal addressed by this study involves demonstrating differences in the behaviors and variable use histories of places that contribute to the archeological site data base for inventory areas.

Chapter 4

Archeological Resources in Survey and Reconnaissance Areas

Sites recorded in the Moderate Production Area include those encountered during reconnaissance and inventory surveys. Reconnaissance surveys include transect surveys conducted in 1983 and surveys to relocate previously recorded sites in the SACA.

Inventory survey refers to the intensive survey of 40-acre sample units with Cultural Resource Inventory Areas I, II, and III. Surveyed sample units and recorded archeological and historical resources are described in the first two sections of this chapter.

A final section assesses the distribution of recorded sites in light of a topographic stratification of the inventory areas and suggests a number of additional sampling procedures for gaining further information on structural sites within the inventory areas and for examining distributional patterns in Zone C with post-inventory samples.

Surveyed Sample Units

Surveyed units comprise a six percent sample of survey quadrats within the inventory areas (Figures 4.1a-4.1c). Sixty-nine 40-acre quadrats comprise the sample.

Table 4.1 lists surveyed sample units by topographic zone. Most severely under represented are Zone C and Zone C/D: survey was completed for 44 percent of the units in Zone C and 66 percent of those in Zone C/D. Also not represented in the present sample inventory are some multi-zone units which include areas of mesa top in Zone A. Most of the Zone D sample units (80 percent) were surveyed.

Table 4.1: Comparison of Completed 6% Sample With the Selected 10% Sample

Zone	# Surveyed Sample Units	# Survey Units In 10% Sample
A/B	1	1
A/C	0	1
A/C/D	0	1
A/B/C	2	2
A/B/C/D	3	2
B	1	1
B/C	2	4
B/C/D	1	1
C	15	34
C/D	35	53
D	9	10
TOTAL	**69**	**110**

Another way to look at the sample is to compare the total amount of area surveyed in each zone with the total area of that zone within the three cultural resource inventory areas.

Surveyed acreage in each topographic zone is listed in Table 4.2. The area represents approximately six percent of the total acreage within the three inventory areas. The sample is not randomly distributed and simply represents the portion of the 10 percent sample that was logistically feasible to survey by April 1, 1984.

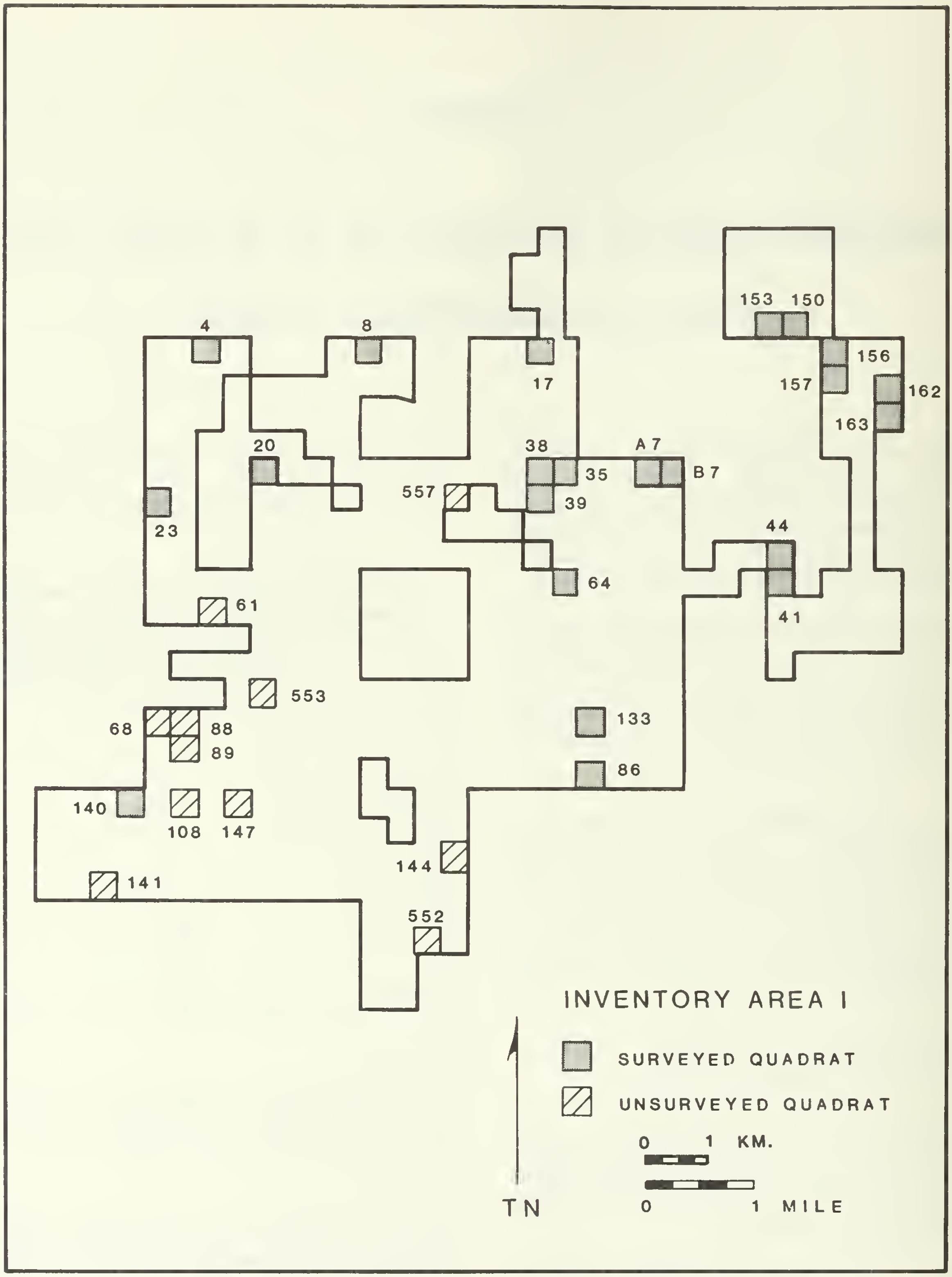


Figure 4.1a: Sample quadrat distribution showing surveyed and unsurveyed quadrats in Inventory Area I.

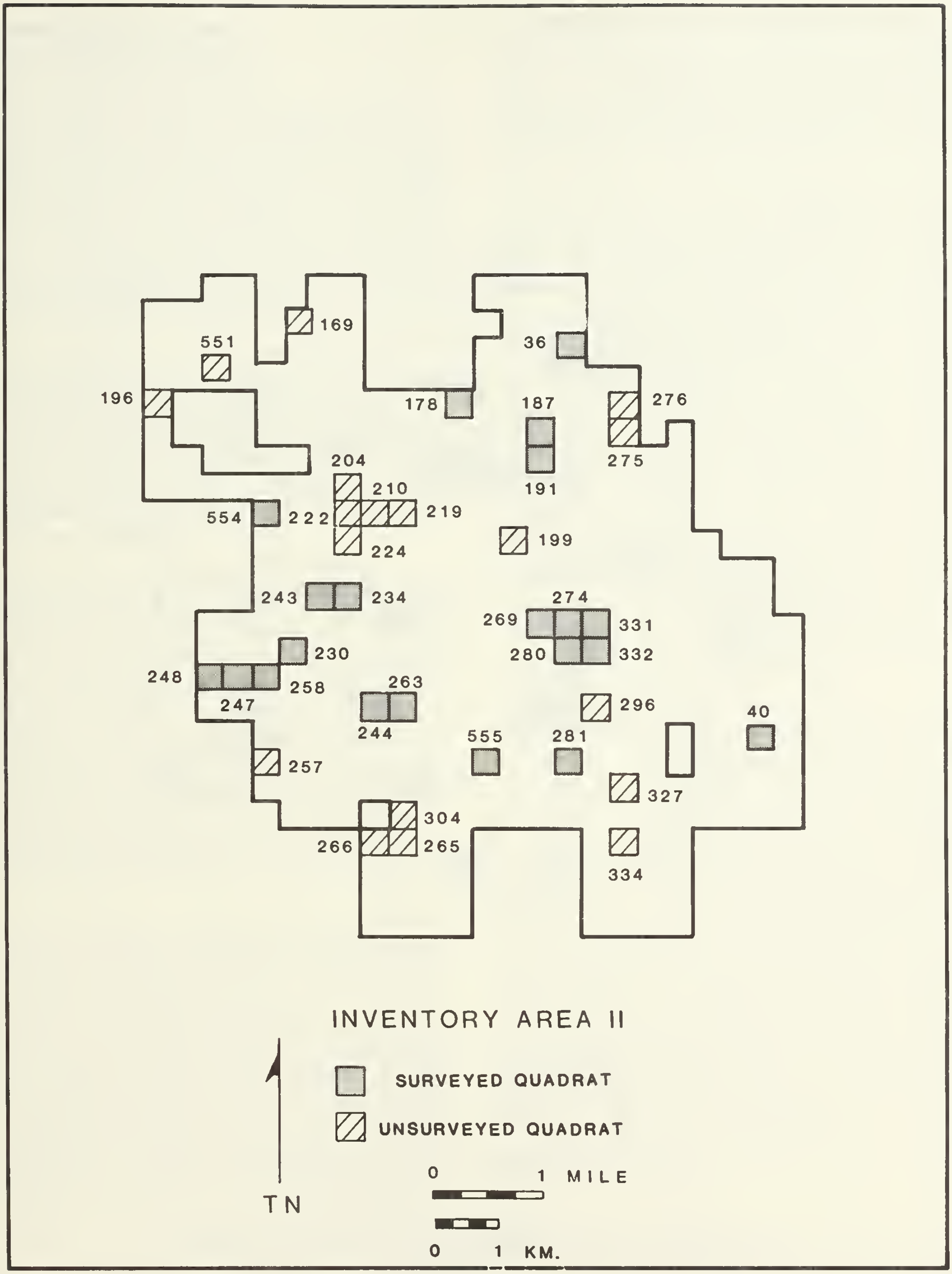


Figure 4.1b: Sample quadrat distribution showing surveyed and unsurveyed quadrats in Inventory Area II.

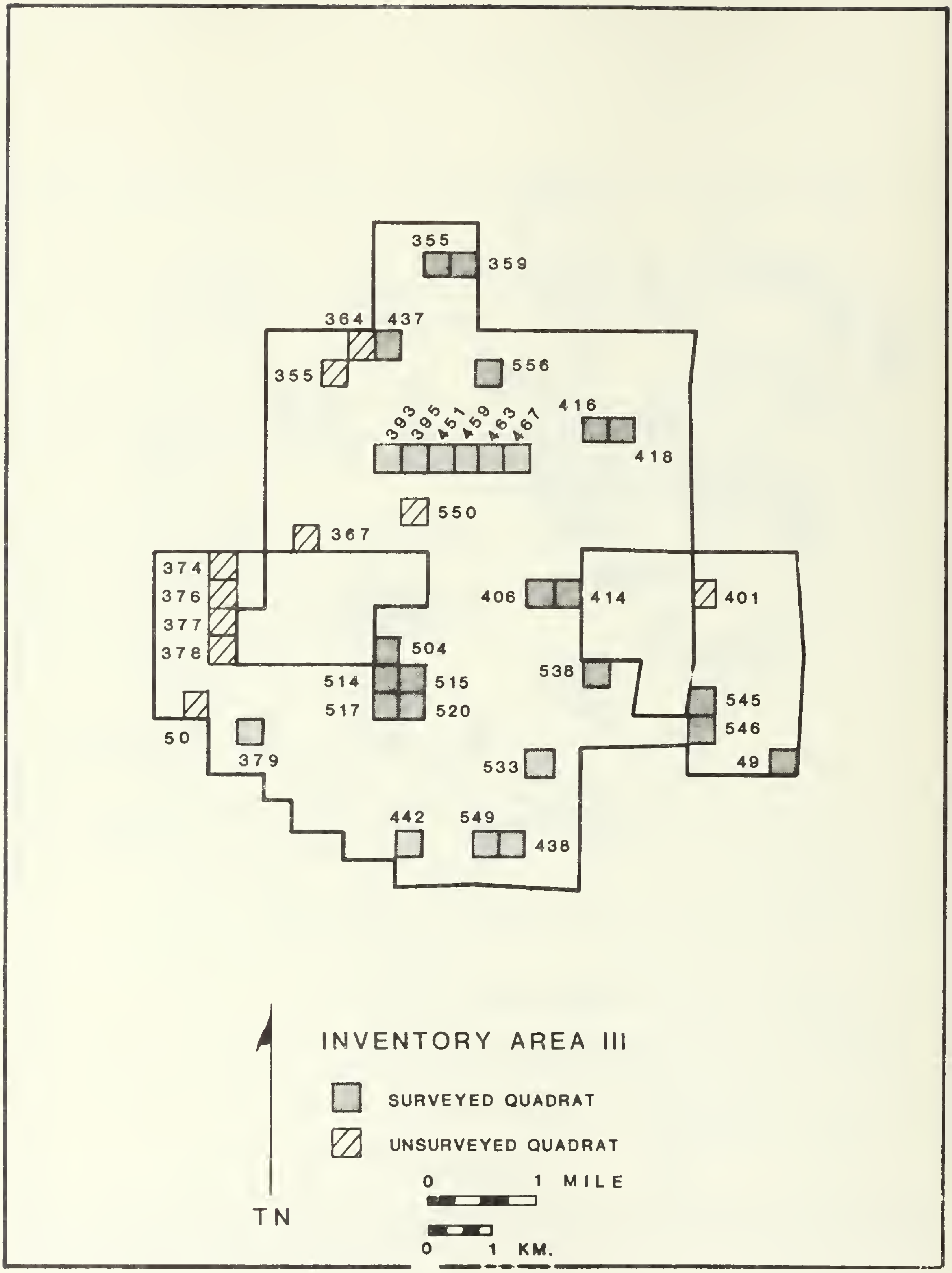


Figure 4.1c: Sample Quadrat distribution showing surveyed and unsurveyed quadrats in Inventory Area III.

Archeological and Historical Resources

An archeological survey of 69 sample units located 128 sites (Figures 4.2a-4.2c), while an additional 18 site locations were recorded during general reconnaissance of the Moderate Production Area. Inventory procedures used a "site" designation for surface distributions of artifacts and features that were readily located on USGS quadrangles as spatially discrete entities.

The designation, "site," is not meant to connote particular activity areas, settlement functions, or temporally and spatially discrete occupations. Rather, the use of a site designation was a means of facilitating the inventory process as implemented by federal cultural resource management policies.

Surveyed Sites and Proveniences

In many cases the spatial structure of artifact distributions at sites was such that several localized or concentrated distributions of archeological materials could be mapped and analyzed. Each of these distributions was designated a site "provenience." The perception of proveniences was in part conditioned by natural factors, such as ephemeral drainages or rock outcrops that separated surface scatters of artifacts and features.

In other instances, surface concentrations of materials recorded as separate proveniences were the result of past behavior, as in the case of mounded refuse or midden deposits or scatters on major architectural features. Adoption of recording procedures utilizing a provenience system was an attempt to obtain a greater amount of spatial control for documentation and analysis purposes. It is not an ideal system, however, since designation of a provenience is arbitrary and dependent on an in-field subjective evaluation of "where the scatter ends." Such subjectivity can lead to a lack of comparability among sampled locations because some fieldworkers may elect to record site proveniences whereas others may record single "sites" at the same location.

In this chapter, a general typology of sites and proveniences has been applied to survey data based on categories of structures, features, and artifacts present in surface distributions. This typology consists of eight classes. Three classes include proveniences with prehistoric features, prehistoric structures, or prehistoric structures and features. Three classes lacking structures and features are lithic, ceramic, and lithic/ceramic scatters. Two final classes consist of locations containing historic structural remains and those containing historic artifact scatters and features. Table 3.1 in Appendix III lists all recorded site/proveniences. Proveniences listed without sample unit (quadrat) number were not contained within survey quadrats, but were discovered and recorded during previous reconnaissance.

Provenience classes recorded by reconnaissance and inventory surveys are listed in Table 4.3 by period of occupation as interpreted from ceramic types present in site assemblages. Inventory survey results alone are also listed in Table 4.4. The Unknown Ceramic (Unknown CER) category includes proveniences at which pottery types were not necessarily indicative of period of occupation using established temporal sequences of ceramic types from west-central New Mexico and east-central Arizona (see Chapter 5), as well as several structural proveniences for which artifactual data were unavailable. The Unknown category includes proveniences lacking lithic and ceramic artifacts. Though proveniences in the Lithic category lack ceramic artifacts, they are not necessarily the result of preceramic or ceramic period occupations.

Table 4.2: Surveyed Acreage in Each Topographic Zone.

Topographic Zone	A	B	C	D	TOTAL
No. Acres Surveyed	44.60	124.50	1454.00	1136.90	2760.00
Percent of Zone	19.22	13.33	5.30	7.86	6.41

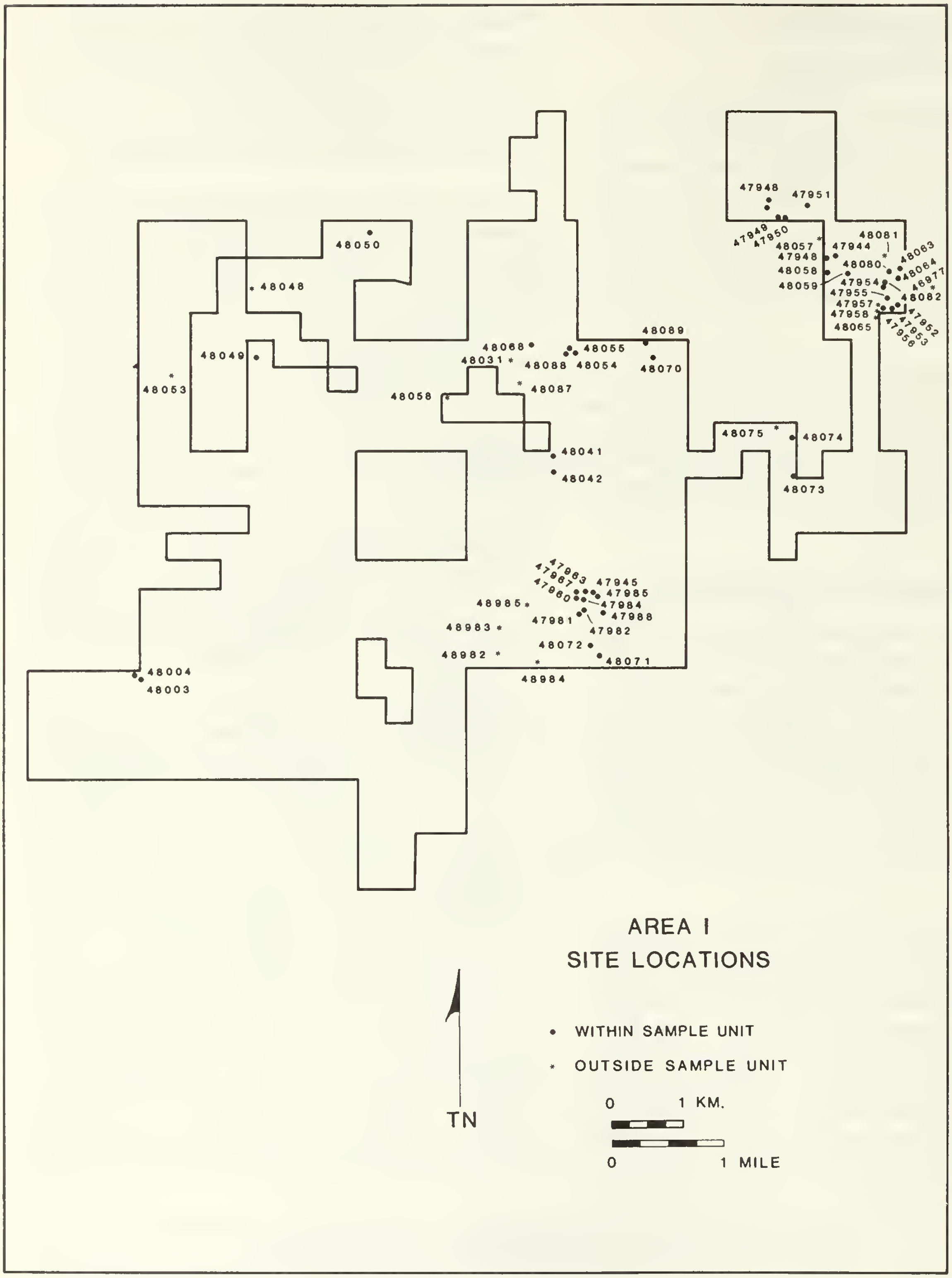


Figure 4.2a: Surveyed site locations in the Moderate Production Area in Inventory Area I.

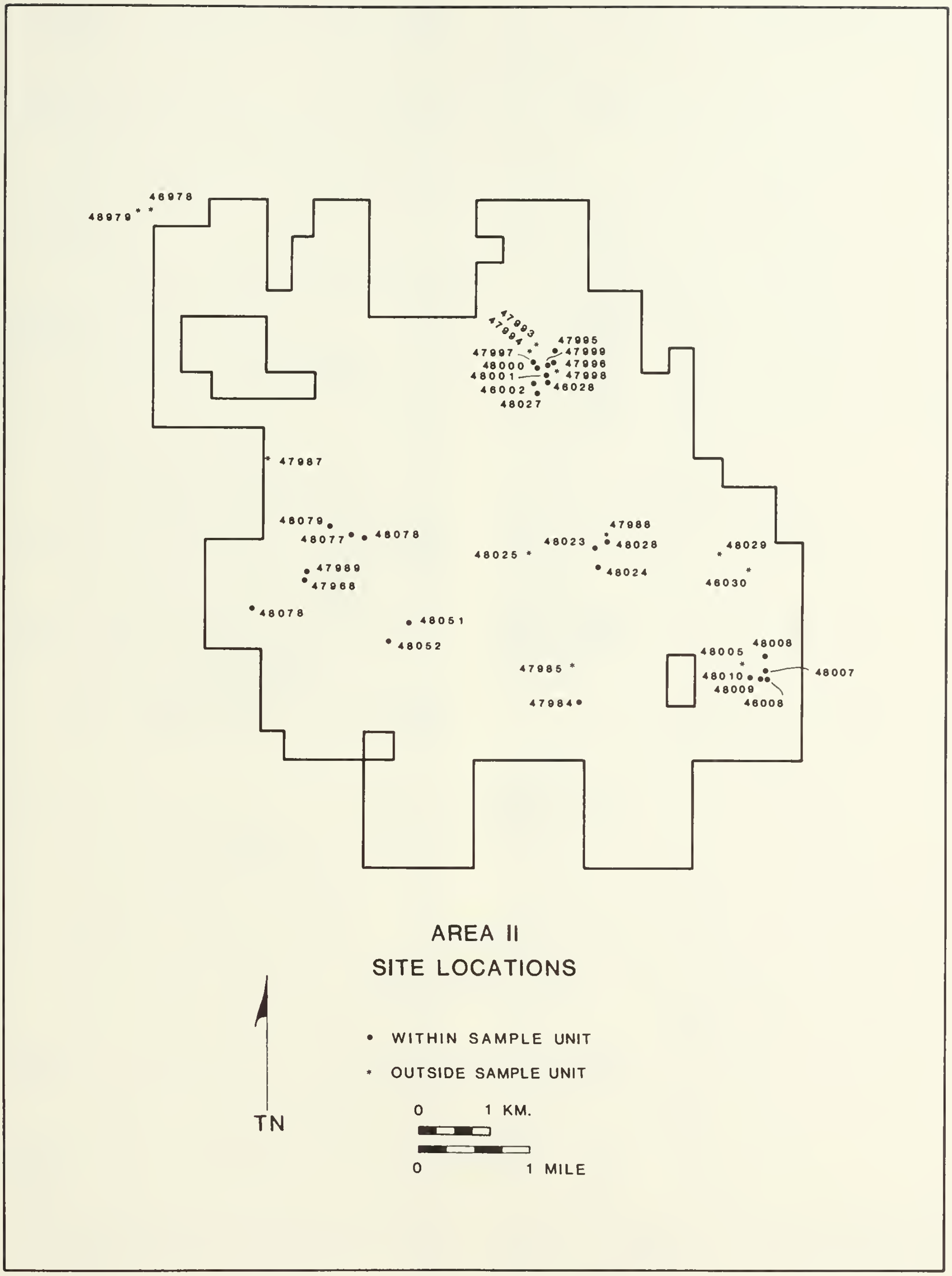


Figure 4.2b: Surveyed site locations in the Moderate Production Area in Inventory Area II.

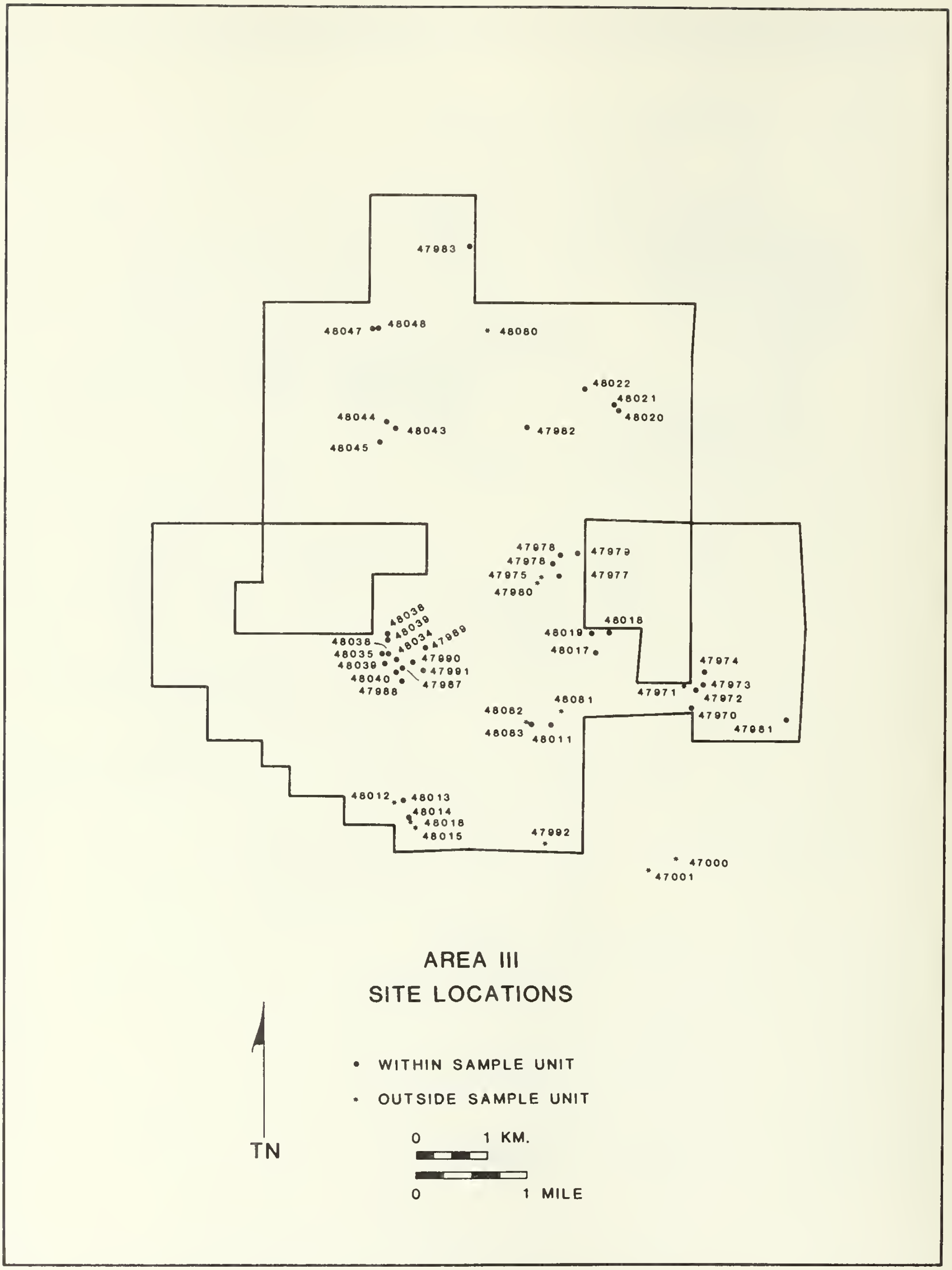


Figure 4.2c: Surveyed site locations in the Moderate Production Area in Inventory Area III

Table 4.3: All Site/Provenience Classes Recorded by the SACA Project

Provenience Class	Lithic	BMIII-PI	BMIII-PII	PI	PI-II	PI-III	PII	PII-III	PII-LIII	PIII	PIII LIII	Unknown CER	Unknown	Historic	TOTALS
Lithic Scatter	23														23
Ceramic Scatter							2	1							3
L/C Scatter			2		9	1	9	6	5	3		2	1		38
Prehistoric Feature	37	2		1	18	2	8	22	8	1	6	1	1		107
Prehistoric Str./Fea.		1			23		11	8	1	9	4	3			60
Prehistoric Structure	1				7		16	7		1	22	1			55
Historic Scatters														12	12
Historic Structure														5	5
TOTALS	**61**	**3**	**2**	**1**	**57**	**3**	**46**	**44**	**14**	**14**	**32**	**7**	**2**	**17**	**303**

Table 4.4: Site/Provenience Classes in 6% Sample

Provenience Class	Lithic	BMIII-PI	BMIII-PII	PI	PI-II	PI-III	PII	PII-III	PII-LIII	PIII	PIII LIII	Unknown CER	Unknown	Historic	TOTALS
Lithic Scatter	22														22
Ceramic Scatter							2	1							3
L/C Scatter			2		9	1	9	6	5	2		2	1		37
Prehistoric Feature	37	1		1	18	2	5	22	7	1	1	1	1		97
Prehistoric Str./Fea.					23		11	3		1		3			41
Prehistoric Structure	1				7		10	3		1	3	1			26
Historic Scatters														10	10
Historic Structure														5	5
TOTALS	**61**	**1**	**2**	**1**	**57**	**3**	**37**	**35**	**12**	**5**	**4**	**7**	**2**	**15**	**237**

Pre-ceramic Period Sites

A single PaleoIndian style projectile point was recorded during the sample survey. A complete, modified Scottsbluff or Eden type was located and recorded within the limits of an artifact scatter surrounding three small basalt-cobble and jacal roomblock foundations. Provenience chronologies that distinguish Archaic from later occupations were not established for SACA sites on the basis of projectile point form. The use of projectile point form as a chronological indicator in west-central New Mexico has been questioned by recent studies (Nelson 1980), and assignment of an individual point to a particular style category is often a relatively arbitrary procedure.

Strong regional variation in Archaic projectile point forms has also been noted by previous researchers (Beckett 1973; Irwin-Williams 1967) and has been cited by Nelson (1980:97) as one reason for the plethora of forms attributed to Archaic occupations. The varied point forms attributed to San Pedro and Chiricahua Archaic occupations have been illustrated by Gossett (1985:Figure 9.1) and Nelson (1980:Figure 3).

Nelson (1980:98) suggests that large point size may be a useful indicator of Archaic period occupation noting, however, that large points also occur at later sites and that small points do not occur at Archaic (lithic) sites. In order to test the idea that small points occur only at lithic/ceramic scatters and large points occur at lithic and lithic/ceramic scatters, a Fischer's exact test was performed using projectile point data collected from surveyed sample units (Appendix V).

Three general point categories are tabulated by provenience class in Table 4.5. A length/width index (maximum length/width measured in mm) was used to segregate large and small points; the index for complete large points exceeds 0.50; complete points with indexes lower than 0.50 were placed in the small category. The length/width index for stemmed points exceeds 0.60 mm. Fragmentary points were placed in large and small categories based on a subjective evaluation of the original outline.

The question of whether a single point form tends to occur more often at scatters yielding only lithic artifacts or at lithic/ceramic sites was asked. Test results (Table 4.6) indicate that there is no justification for expecting small points to occur exclusively at lithic/ceramic sites (p=0.419) or for expecting large points to occur more frequently at either lithic or lithic/ceramic sites (p=0.627). Thus, Nelson's observation that large points occur at both lithic/ ceramic sites applies to SACA survey data. Survey data also indicate that with the few number of points recorded, there is no significant difference in the occurrence of small points at lithic and lithic/ceramic sites. In the group of 60 lithic scatters recorded, a lanceolate point with a concave base, a large side-notched point, and a stemmed point each occur at separate sites; a large side-notched point and a small side-notched point occur together at one provenience; and a stemmed and large side-notched point at another.

Table 4.5. Sampled Proveniences at which Projectile Points Occur

	Provenience Class			
POINT GROUP	Lithic Scatter	Lithic Scatter w/Fea.	Lithic/ Ceramic Scatter	Lithic/Ceramic Scatter with Fea./Structure
Large corner- & side-notched & stemmed	2	2	5	8
Small corner & side-notched	1			8
Lanceolate concave base	1			1

Table 4.6: Distribution of Large and Small Projectile Points at Lithic and Ceramic Scatters				
Point Group		**Provenience Class**		
		Lithic	**Lithic/Ceramic**	**Total**
Large	(Frequency=)	4.00	13.00	17.00
	(Percent=)	15.38	50.00	65.38
	(Row Percent=)	23.53	76.47	
	(Col. Percent=)	80.00	61.90	
Small	(Frequency=)	1.00	8.00	9.00
	(Percent=)	3.85	30.77	43.62
	(Row Percent=)	11.11	88.89	
	(Col. Percent=)	20.00	38.10	
TOTAL		5.00	21.00	26.00
		19.23	80.77	100.00
Fischer's Exact Test (1-tail) p = 0.419		(2-tail) p = 0.627		

Ceramic Period Sites

A majority of the Ceramic period proveniences (37 percent) in the six percent sample have been assigned to the Pueblo I-II period. These findings contrast with the percentage of Pueblo I-II period components in the SACA previously recorded site inventory (Chapter 1). Some differences in the frequency of Pueblo I-II manifestations are to be expected given the definitional difference between SACA proveniences (spatial units) and Museum of New Mexico site components (temporal but not necessarily spatial units).

Assigning components to the Pueblo I-II period based on previous surveys relies by and large on the presence of Red Mesa Black-on-white in ceramic assemblages (Elyea 1983; Hogan 1983) similar to the provenience classification by Ford for SACA sites.

Since the differences among the proportions of Pueblo I-II period manifestations in SACA and other survey inventories are relatively great, they may stem from a distribution of Pueblo I-II period remains which is more concentrated in portions of the inventory areas than in previously surveyed areas.

Within the inventoried areas, surveyed Pueblo I-II proveniences cluster in three settings. Moderate densities of proveniences are located northeast and southeast of Hawkins Peak at the bases of mesas and on low ridges. Higher densities occur in the foothills of the scarp forming the western boundary of the Continental Divide. Highest densities are positioned on ridges tapering between tributaries of upper Tejana Draw with particularly dense distributions of structural and nonstructural remains at the base of the scarp ringing the head of Tejana Draw between Tejana Mesa and Mesa Tinaja. This last area lies immediately north of the Cerro Colorado site, the location of numerous pithouses and associated remains dated to the Basketmaker III and Pueblo I periods.

Proveniences dated to Pueblo II and Pueblo II-III periods occur at lower percentages, 23 and 22 respectively, in the six percent sample. Higher frequencies of Pueblo II structural proveniences occur in the sample than do those assigned to the Pueblo II-III period. Although very low frequencies of Pueblo III and late Pueblo III period proveniences are present in the sample, the frequencies included are almost equally divided between structural and nonstructural categories.

Pueblo II and later proveniences appear to be distributed predominantly on ridges, both at the upper reaches of watercourses and along the edges of alluviated valleys where tributary drainages enter main watercourses.

A relatively high proportion of Ceramic Period proveniences (28 percent) contain structural remains. The types of prehistoric features

present in the six percent sample are listed in Table 4.7. Ash stains and scatters of fire-cracked rock (FCR) are by far the most common sorts of features in the study area. When architecture is included in this tabulation, structures are the next most numerous type of feature.

Table 4.7: Prehistoric Features in 6% Sample

Features	Frequency
Hearths	35
Ash/FCR	140
Middens	28
Pit structures	26
Water control features	5
Rock art	2
Rubble features	32
Other	5
TOTAL	273

Quite common are one-room to four-room structures (Figure 4.3); larger architectural features comprising units of up to 50 rooms are also present in the reconnaissance and inventory samples (Figure 4.4). The room count per structure averages 7.24 with an interquartrile range of between two and eight rooms. Actual structure area averages 227.76 m^2 with an interquartrile range of 24 to 162.5 m^2 (from about 5 m to about 12 m on a side).

Construction techniques utilizing simple sandstone masonry followed by simple basalt block masonry and sandstone and basalt block foundations are the most commonly encountered types (Table 4.8). Compound and core/veneer techniques incorporating sandstone slab, masonry, and jacal elements are also relatively common. Combining room count and construction technique, most structures recorded are simple sandstone masonry units of from one to four rooms. High numbers of similar sized basalt masonry structures also occur (Table 4.9). Larger structures of over five rooms are also predominantly constructed of simple sandstone masonry.

Figures 4.5a-4.5c compare room count and structure area. While most simple masonry structures (Figures 4.5a and 4.5b) may consist of few rooms, the range of overall structure size is rather wide and may be trimodally distributed. The tendency toward larger structures is indicated for those built with compound/core-veneer techniques (Figure 4.5c).

Historic Period Sites

Few historic period remains are contained in the six percent sample. Common features at historic site locations include one- to four-room buildings of a variety of constructions and corrals (Table 4.10). The "Other" category includes features associated, for the most part, with homestead complexes, e.g. chicken coups, adobe pits, small pens, etc. The history of land tenure in the Nations Draw area and the specific functions of particular locations of historical remains are described in Volume 2 (Kelley 1988).

Table 4.8: Prehistoric Structure Construction Techniques

	CONSTRUCTION CLASS			
CONTECH	Frequency	Cum.Freq.	Percent	Cum Percent
Indeterminate	11	11	8.029	8.029
Sandstone block foundation	15	26	10.949	18.978
Basalt foundation	16	42	11.679	30.657
Adobe/jacal	5	47	3.650	34.307
Compound foundation	8	55	5.839	40.146
Sandstone simple masonry	47	102	34.307	74.453
Basalt simple masonry	20	122	14.599	89.051
Simple compound element	1	123	0.730	89.781
Compound/core-veneer	14	137	10.219	100.000

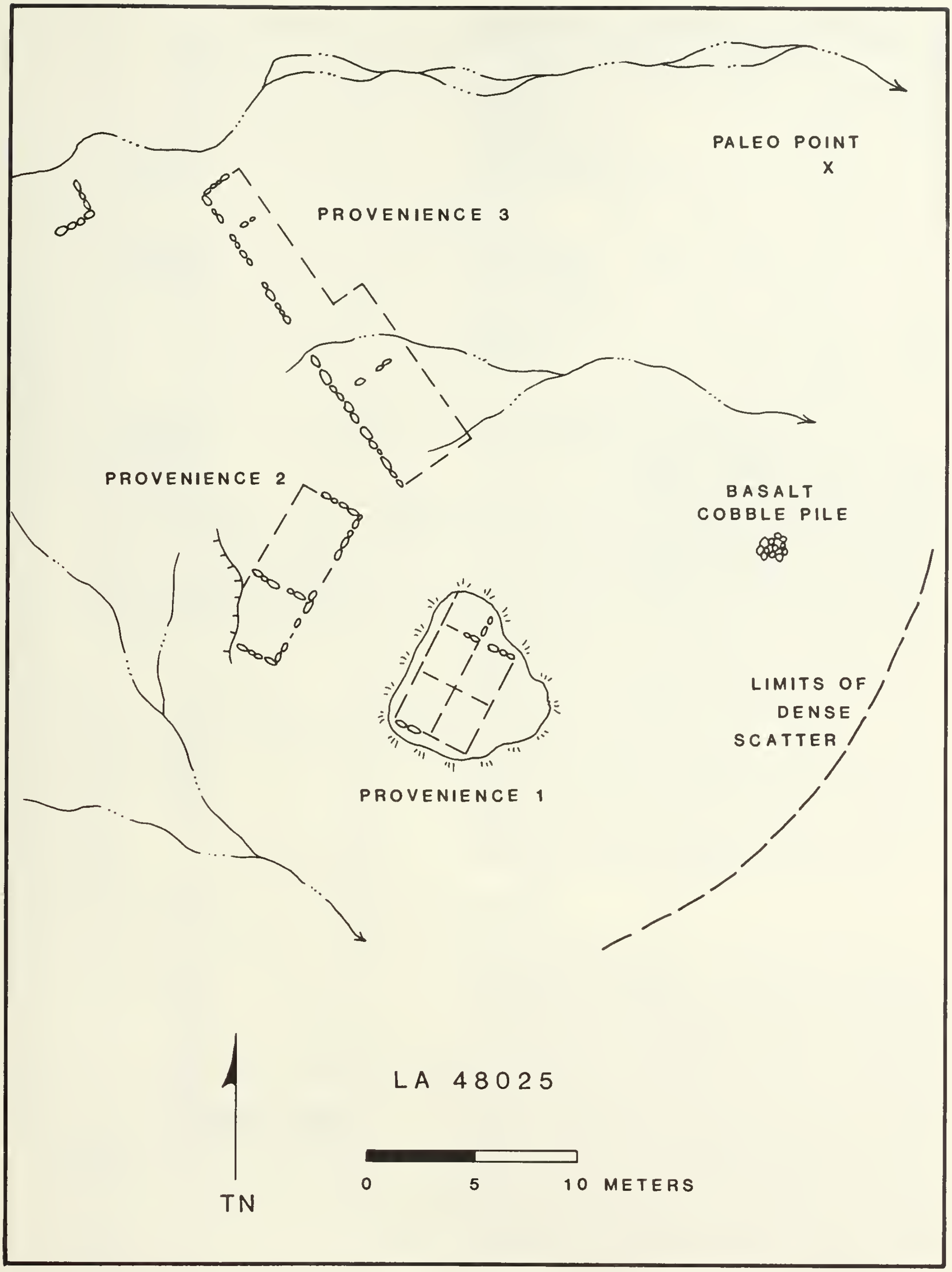


Figure 4.3: Basalt and cobble/jacal roomblock foundations of small structures and the location of the only PaleoIndian style projectile point recorded during the SACA survey at LA 48025 (Site 326)

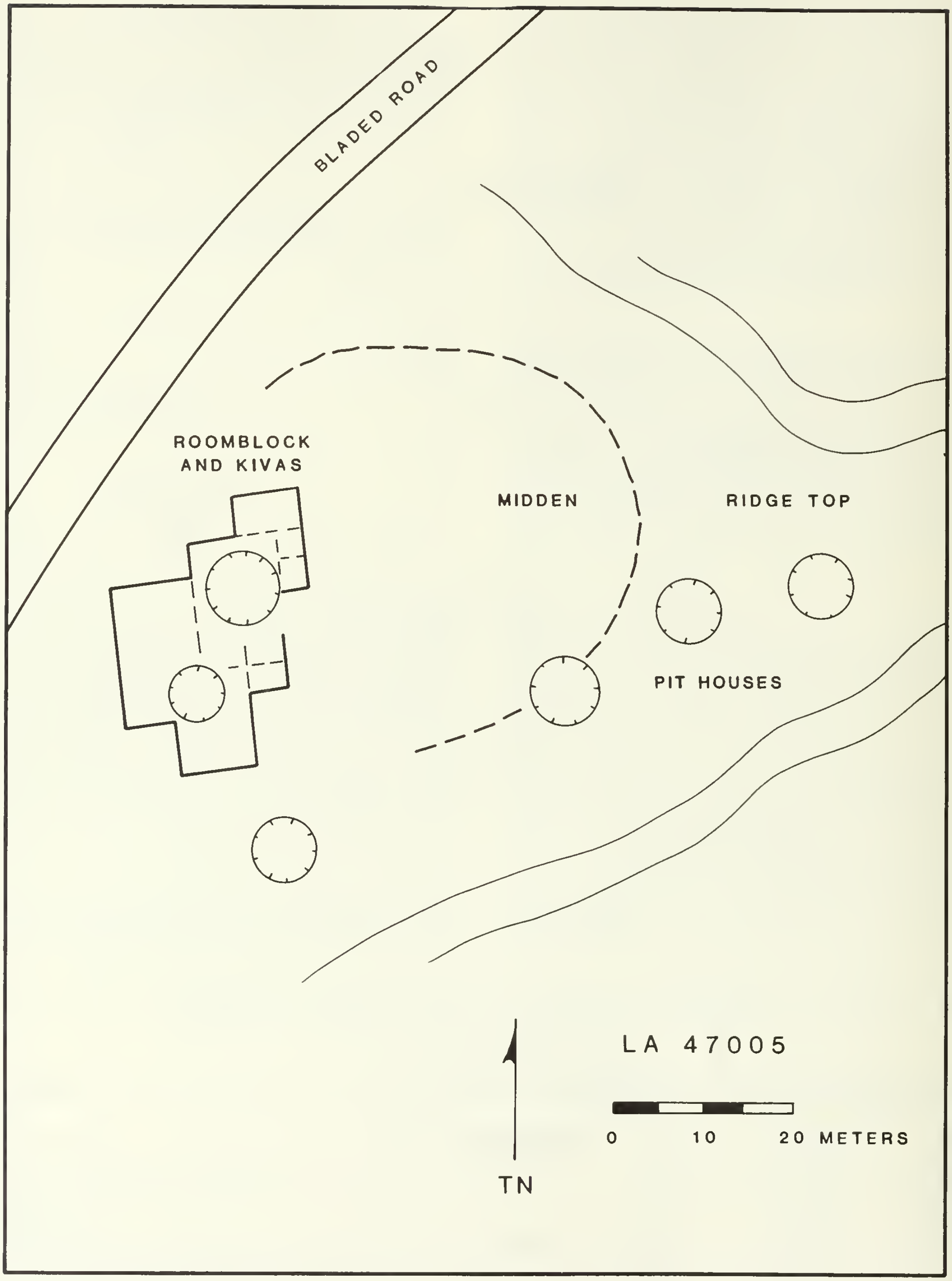


Figure 4.4: A moderately large sandstone slab roomblock of 20 rooms at LA 47005 (Site 185)

Table 4.9: Construction Techniques and Room Counts for Prehistoric Structures

No. Rooms	Room Count	Construction and Class								
	Indeterm.	S-S Block Foundation	Basalt Foundation	Adobe/ Jacal	Compound Foundation	S-S Simple Masonry	Basalt Simple Masonry	Simple Compnd. Elements	Compnd./ Core- -Veneer	TOTAL
Indet.	4	5	5	3	2	5	0	0	0	.
1 to 4	4	7	7	2	4	22	14	0	4	64
5 to 14	2	1	4	0	2	13	5	0	6	33
15 plus	1	2	0	0	0	7	1	1	4	16
TOTAL	7	10	11	2	6	42	20	1	14	113

Table 4.10: Historic Structures and Features in the 6% Sample

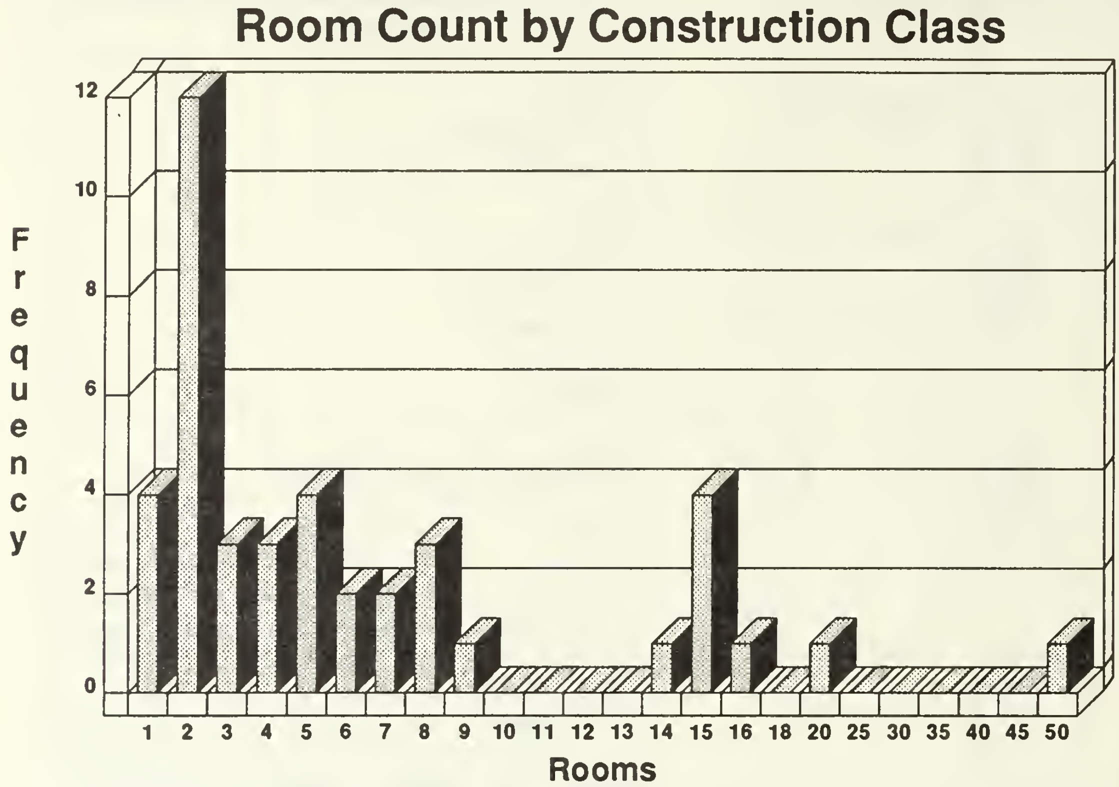
Feature	Frequency
Corrals	12
Trash middens	3
Windmills	2
Ovens	1
Hearths	3
Outbuildings	2
Water tanks	1
Other features	11
Structures	17
TOTAL	**52**

Distributional Patterns

Classes of features, structures, and site proveniences in the six percent sample can be compared for their distributions with respect to topographic strata and categories of vegetation and terrain as listed on the Laboratory of Anthropology, Museum of New Mexico archeological site survey form. Counts of prehistoric, historic, and structural features are first listed in the following tables by categories of terrain and vegetation. Inspection of the distributions of features and structures with respect to these categories enables identification of the dominant landform and vegetation classes within which features occur. The distribution of provenience classes can also be compared to that of individual features.

Terrain

Table 4.11a-c lists prehistoric, historic, and structural features by terrain categories. Ridges are the dominant terrain for all types of features. More than half of the prehistoric features located are situated on ridges. Moderate numbers of prehistoric features are also situated on hill slopes and on mesa tops. Ridges clearly dominate the pattern presented by historic features with single features also located on hill slopes and in flats. Highest frequencies of historic structures are in areas of flats. Prehistoric structures present the most varied pattern. Over half (58 percent) of the structures recorded are located on ridges; hill slopes, talus bases, and low rises are the other terrain categories in areas separating alluviated valleys and are associated with lower incidences of structures.



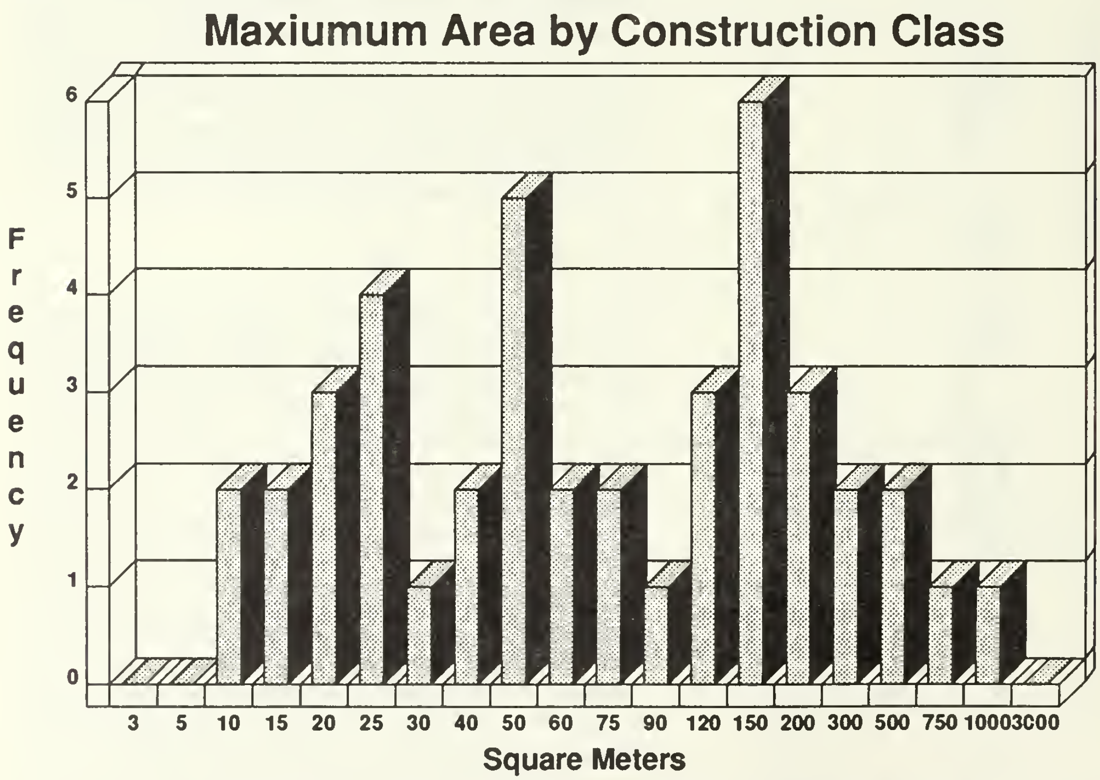
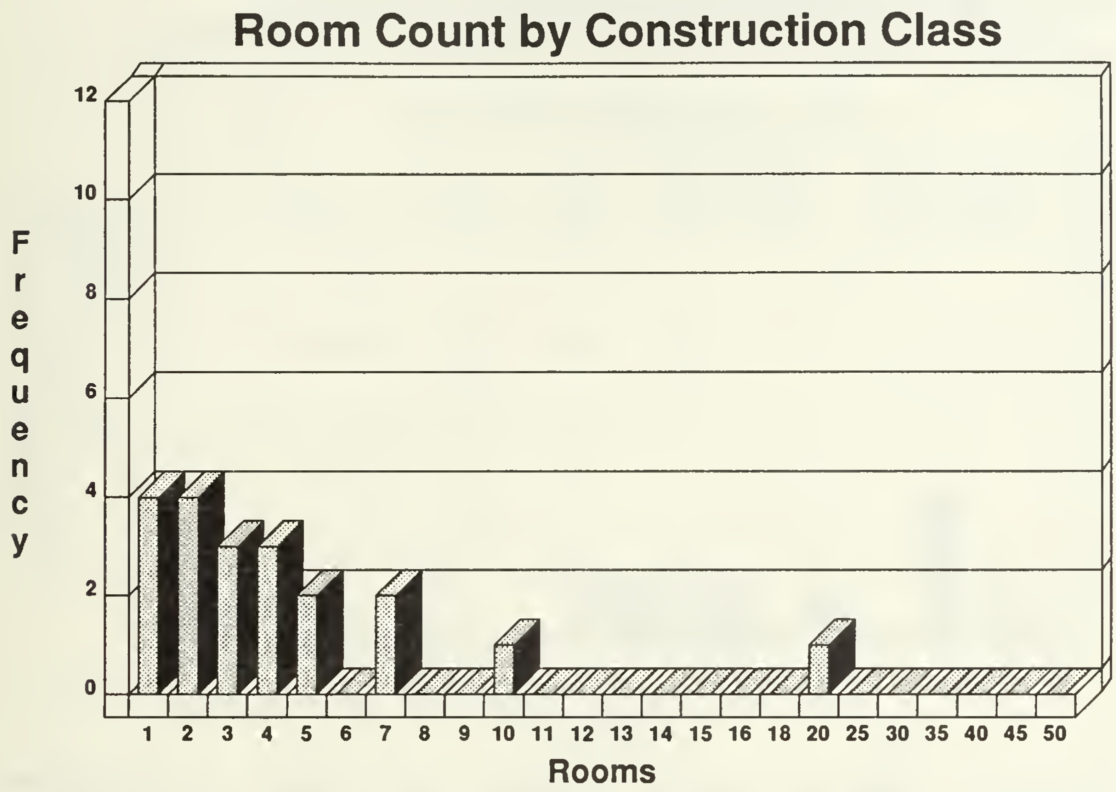


Figure 4.5a: Distribution of Prehistoric Sandstone Simple Masonry Structure Area and Number of Rooms



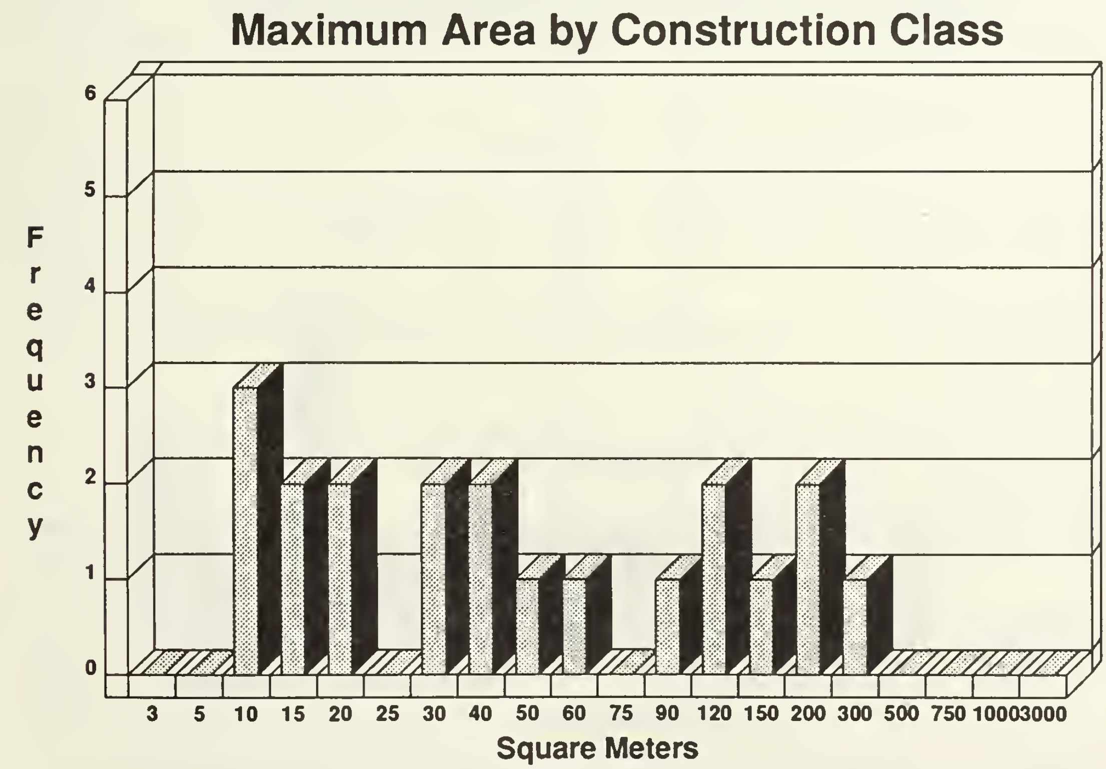
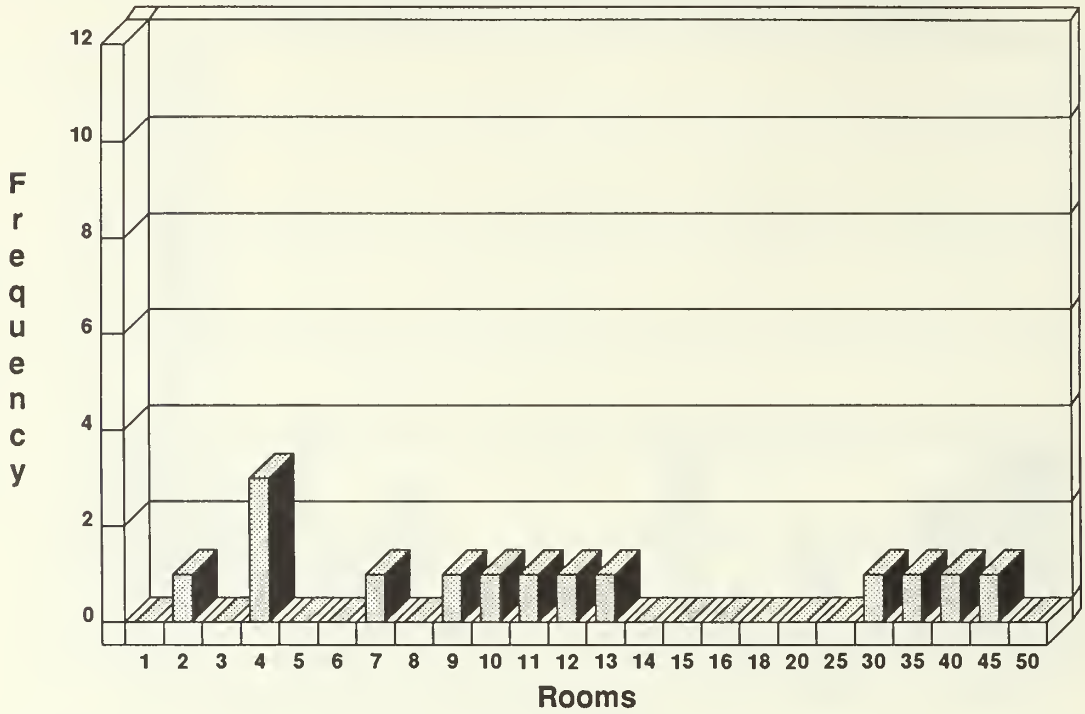


Figure 4.5b: Distribution of Prehistoric Basalt Simple Masonry Structure Area and Number of Rooms

Room Count by Construction Class



Maximum Area by Construction Class

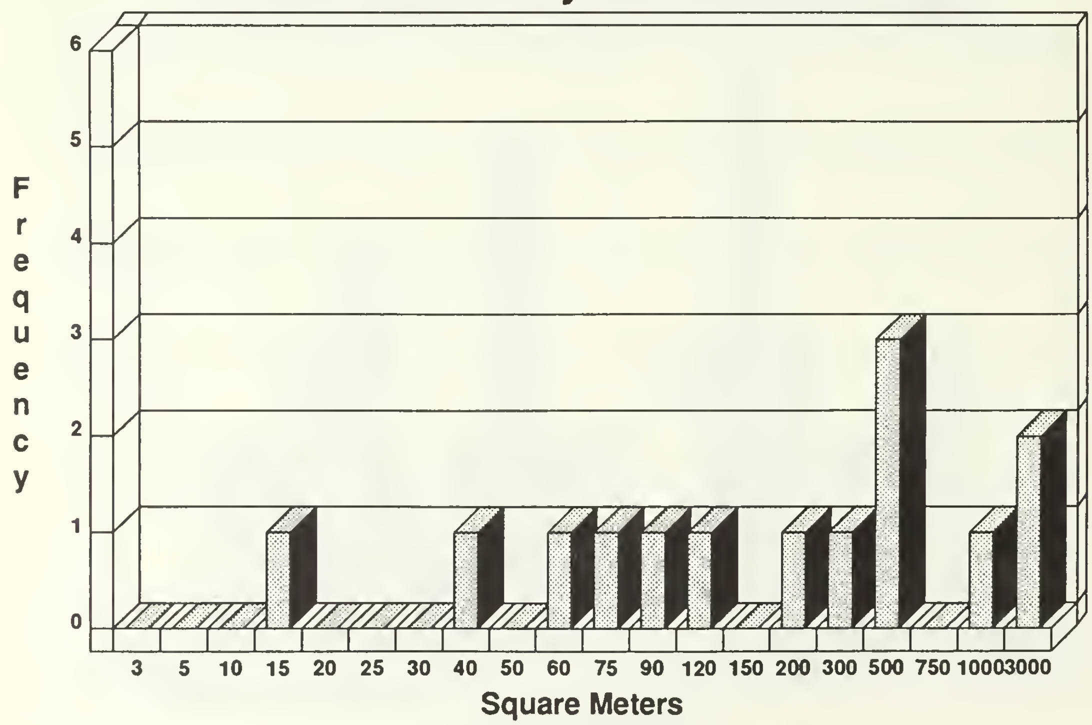


Figure 4.5c: Distribution of Prehistoric Core and Veneer and Compound Masonry Structure Area and Number of Rooms

Table 4.11: Distribution of Proveniences in Terrain Categories (a) Prehistoric Features; (b) Structural Features; (c) Historic Features

(a) Prehistoric Features by Terrain

Terrain	Hearths	Ash/ FCR	Mid-dens	Pit Struc-tures	Water Control Features	Rock Art	Rubble Features	Other Features	Total Features
Arroyo/Wash	-	-	-	-	4	-	-	-	4
Flood/Valley	-	-	-	-	-	-	-	-	-
Plain/Flat	2	-	-	-	-	-	1	-	3
Canyon Floor	-	1	-	-	-	-	-	-	1
Low Rise	1	-	3	2	-	-	3	-	9
Ridge	20	75	19	19	-	-	21	4	158
Saddle	-	15	-	-	-	-	1	-	16
Talus Base	-	2	1	-	-	-	-	-	3
Cliff/Scarp	-	3	-	-	-	2	-	-	5
Mesa	5	6	-	-	-	-	-	-	11
Hill Top	1	-	2	-	-	-	1	-	4
Hill Slope	6	38	3	5	1	-	5	1	59
Talus	-	-	-	-	-	-	-	-	-
TOTAL	**35**	**140**	**28**	**26**	**5**	**2**	**32**	**5**	**273**

(b) Structural Features by Terrain

Terrain	Total Rooms	Kivas	1 Room Struc-tures	2-5 Rm. Struc-tures	6-14 Room Structures	15-50 Room Structures	Total Struc-tures
Arroyo/Wash	-	-	0	0	0	0	0
Flood/Valley	2	-	0	1	0	0	1
Plain/Flat	2	-	0	1	0	0	1
Canyon Floor	-	-	0	0	0	0	0
Low Rise	16	-	1	0	0	1	2
Ridge	176	3	5	21	6	3	35
Saddle	-	-	0	0	0	0	0
Talus Base	11	-	0	1	1	0	2
Cliff/Scarp	-	-	0	0	0	0	0
Mesa	-	-	0	0	0	0	0
Hill Top	5	-	1	2	0	0	3
Hill Slope	46	-	5	8	3	0	16
Talus	-	-	0	0	0	0	0
TOTAL	**258**	**3**	**12**	**34**	**10**	**4**	**60**

(c) Historic Features by Terrain

Terrain	Corrals	Trash	Wind-mills	Ovens	Hearths	Out-bldgs	Water Tanks	Other Features	Total Features	Total Struct.
Arroyo/Wash	-	-	-	-	-	-	-	1	1	-
Flood/Valley	-	-	-	-	-	-	-	1	1	1
Plain/Flat	2	1	1	-	2	1	1	1	9	7
Canyon Floor	-	-	-	-	-	-	-	-	-	1
Ridge	9	2	1	1	-	1	-	5	19	5
Hill Slope	1	-	-	-	1	-	-	3	5	3
TOTAL	**12**	**3**	**2**	**1**	**3**	**2**	**1**	**11**	**35**	**17**

Table 4.12: Distribution of Site/Provenience Types Versus Terrain

Terrain	Pre-hist. Features	Prehist. Structures	Prehist. Struct./Features	Lithic Scatter	Ceramic Scatter	Lithic/Ceramic Scatter	Histor-ical Fea./Scat.	Histor-ical Struct.	TOTAL
				Site/Provenience Types					
Talus Base	2	1	1	0	0	1	0	0	5
Cliff/Scarp	2	0	0	0	0	0	0	0	2
Mesa	7	0	0	2	0	4	0	0	13
Hill Top	1	2	1	0	0	0	0	0	4
Hill Slope	13	8	8	3	0	6	2	3	43
Talus	0	0	0	0	0	2	0	0	2
Arroyo/Wash	1	0	0	0	1	1	1	0	4
Flood/Valley	0	1	0	0	0	2	0	1	4
Plain/Flat	1	1	0	0	0	0	0	2	4
Canyon Floor	1	0	0	3	0	1	0	1	6
Low Rise	3	1	2	1	0	3	0	0	10
Ridge	50	8	29	12	2	17	2	3	123
Saddle	16	0	0	1	0	0	0	0	17
TOTAL	**97**	**22**	**41**	**22**	**3**	**37**	**5**	**10**	**237**

Site proveniences mirror the above pattern (Table 4.12). Half of all proveniences are situated on ridges, with moderate percentages located on mesa tops and hill slopes. Provenience classes that occur most frequently on ridges include prehistoric structure and structure/feature classes; they also occur in moderate percentages on mesa tops and hill slopes. This pattern is not surprising since a majority of the inventory area (about 64 percent) includes ridges and foothills. A six percent sample is thus most likely to include remains associated with the dominant landforms present in sampled areas; a larger sample is more likely to include archeological locations on landforms which occur less frequently in the sampling universe.

Vegetation

Of the vegetation categories, woodland and parklands are the areas where archeological features and structures occur most frequently (Table 4.13a-c). Site proveniences are similarly distributed with respect to vegetation. About half of recorded proveniences occur in areas of piñon-juniper woodland (Table 4.14). A relatively high percentage of proveniences also occurs in more open piñon-juniper parkland settings and in woodland dominated by juniper rather than piñon. Shrublands, grasslands, and marshlands contain low percentages of proveniences. This pattern should be expected given that ridges and foothills which dominate the inventory areas are vegetated predominantly by piñon-juniper woodland.

Assessing Sample Distributions

Patterns of distribution for feature and provenience classes are analyzed here by topographic zone. All four zones contain survey units yielding cultural remains: A (Mesa and Ridge Tops); B (Steep Talus); C (Foothills and Ridges); and D (Flats).

Prehistoric features and structures occur predominantly in Zone C (Table 4.15), ridges and foothills dominated by piñon-juniper woodland. Historic features and structures are almost equally distributed between Zones C and D.

The distribution of prehistoric structures with respect to topographic zone must be qualified. Zone C clearly contains the highest frequencies of prehistoric structures; however, reconnaissance of the inventory areas has noted relatively high frequencies of structural remains on mesa tops, a pattern that is not represented in the six percent sample.

Given the low amount of acreage present in Zone A, a much higher sampling fraction may be needed to represent archeological remains in this zone adequately. Sampling a small population, in this case zone acreage, has been considered by Cowgill:

Table 4.13: Distribution of Preveniences in Vegetation Categories (a) Prehistoric Features; (b) Structural Features; (c) Historic Features

(a) Prehistoric Features by Vegetation

Vegetation	Hearths	Ash/ FCR	Mid- dens	Pit Struc- tures	Water Control Features	Rock Art	Rubble Features	Other Features	Total Features
Grassland	-	-	2	2	-	-	4	-	8
Scrubland	2	3	1	-	-	-	2	-	8
P-j Parkland	3	3	3	-	-	-	3	-	12
P-j Woodland	18	89	20	24	5	2	21	5	184
J-p Woodland	12	44	2	-	-	-	2	-	60
Marshland	-	1	-	-	-	-	-	-	1
TOTAL	**35**	**140**	**28**	**26**	**5**	**2**	**32**	**5**	**273**

(b) Structural Features by Vegetation

Vegetation	Total Rooms	Kivas	1 Room Struc- tures	2-5 Rm. Struc- tures	6-14 Room Structures	15-50 Room Structures	Total Struc- tures
Grassland	2	-	0	1	0	0	1
Scrubland	21	-	2	2	0	1	5
P-j Parkland	46	-	0	5	2	1	8
P-j Woodland	178	3	8	25	7	2	42
J-p Woodland	11	-	2	1	1	0	4
Marshland	-	-	0	0	0	0	0
TOTAL	**258**	**3**	**12**	**34**	**10**	**4**	**60**

(c) Historic Features by Vegetaion

Vegetation	Corrals	Trash	Wind- mills	Ovens	Hearths	Out- bldgs	Water Tanks	Other Features	Total Features	Total Struct.
Grassland	-	-	-	-	-	-	-	1	1	1
Scrubland	1	1	1	-	1	-	1	1	6	3
P-j Parkland	9	2	1	1	2	2	-	6	23	12
P-j Woodland	2	-	-	-	-	-	-	1	3	1
J-p Woodland	-	-	-	-	-	-	-	2	2	-
TOTAL	**12**	**3**	**2**	**1**	**3**	**2**	**1**	**11**	**35**	**17**

Table 4.14: Distribution of Site/Provenience Types Versus Vegetation

	Site/Provenience Types								
Vegetation	Pre- hist. Features	Prehist. Struc- tures	Prehist. Struct./ Features	Lithic Scatter	Ceramic Scatter	Lithic Ceramic Scatter	Histor- ical Fea./Scat.	Histor- ical Struct.	TOTAL
Grassland	3	1	1	0	0	3	0	1	9
Scrubland	2	2	3	0	0	3	1	1	12
P-j Parkland	6	2	5	7	0	7	1	7	35
P-j Woodland	55	15	29	12	2	21	2	1	137
J-p Woodland	30	2	3	3	1	2	1	0	42
Marshland	1	0	0	0	0	1	0	0	2
TOTAL	**97**	**22**	**41**	**22**	**3**	**37**	**5**	**10**	**237**

Table 4.15: Distribution of Feature Classes in Topographic Zones (a) Structural Features; (b) Prehistoric Features; (c) Historic Features

(a) Structural Features by Environment

Topographic Zone	Total Rooms	Kivas	1 Room Struc-tures	2-5 Rm. Struc-tures	6-14 Room Structures	15-50 Room Structures	Total Struc-tures
A	-	-	0	0	0	0	0
B	16	-	0	1	1	0	2
C	228	3	11	30	8	4	53
D	14	-	1	3	1	0	5
TOTAL	**258**	**3**	**12**	**34**	**10**	**4**	**60**

(b) Prehistoric Features by Environment

Topographic Zone	Hearths	Ash/ FCR	Mid-dens	Pit Struc-tures	Water Control Features	Rock Art	Rubble Features	Other Features	Total Features
A	5	6	-	-	-	-	-	-	11
B	1	11	2	-	-	-	5	-	19
C	26	123	24	26	5	2	20	5	231
D	3	-	2	-	-	-	7	-	12
TOTAL	**35**	**140**	**28**	**26**	**5**	**2**	**32**	**5**	**273**

(c) Historic Features by Environment

Topographic Zone	Corrals	Trash	Wind-mills	Ovens	Hearths	Out-bldgs	Water Tanks	Other Features	Total Features	Total Struct.
C	4	1	1	1	3	2	-	7	19	8
D	8	2	1	-	-	-	1	4	16	9
TOTAL	**12**	**3**	**2**	**1**	**3**	**2**	**1**	**11**	**35**	**17**

> ... [there is a] persistent delusion that there is some special merit in a 10% sample, or in any other preconceived sampling fraction for that matter ... unless the sampling fraction is more than 20% of the total population, the proportion of the population included in the sample is of negligible importance. What is virtually all-important is the absolute size of the sample; that is, the number of independent cases included in the sample. For a population of 40, a 50% sample may be barely adequate, while for a population of 200 million, a 0.01% sample (20,000 cases) may be more than ample (1975:263).

Thus, the extremely low acreage in Zone A may require a relatively high sampling fraction, perhaps as high as 50 percent of the total acreage in that zone in order to obtain a representative sample of the archeological remains there.

Site Distributions: Management Considerations

The frequencies of recorded locations in the six percent sample can be translated into densities of provenience classes in each topographic zone (Table 4.16). Likewise, the densities of rooms, features, and structures can be calculated for each zone. Based on limited reconnaissance of unsurveyed areas, counts for all provenience classes in Zone A are under represented in the present six percent sample. Large architectural units may also be under represented in Zone C.

Tables 4.17 and 4.18 list the densities of features (rooms and structures in this table are prehistoric) and provenience classes in each zone. Densities are given for 40-acre parcels. In Table 4.17 densities calculated with a three percent sampling fraction of the total number of quadrats are compared with those based on a six percent sampling fraction. Each sample is a nonrandom one, that is, quadrats were not

Table 4.16: Distribution of Site/Provenience Classes in Topographic Zones

Zone	Pre-hist. Features	Prehist. Structures	Prehist. Struct./Features	Site/Provenience Types: Lithic Scatter	Ceramic Scatter	Lithic Ceramic Scatter		Historical Fea/Scat	Historical Struct.	TOTAL
A	7	0	0	2	0	3		0	0	12
B	5	1	1	0	0	2		0	0	9
C	81	18	36	18	3	26	5	4	4	191
D	4	3	4	2	0	6	0	6	0	25
TOTAL	**97**	**22**	**41**	**22**	**3**	**37**		**5**	**10**	**237**

Table 4.17: Feature and Structure Density (per 40 acres) in Topographic Zones Compared for Two Sampling Rates.

Zone	Feature	3 Percent Sample	6 Percent Sample
A	Rooms	*	*
	Structures	*	*
	Historic Features	*	*
	Prehistoric Features	19.66	9.86
B	Rooms	**	5.14
	Structures	**	0.64
	Historic Features	**	0.00
	Prehistoric Features	**	6.10
C	Rooms	6.09	6.25
	Structures	1.15	1.46
	Historic Features	0.43	0.22
	Prehistoric Features	7.14	6.35
D	Rooms	0.53	0.49
	Structures	0.40	0.18
	Historic Features	0.66	0.32
	Prehistoric Features	0.53	0.08

Table 4.18: Site/Provenience Densities (per 40 acres) by Topographic Zone in the 6% Sample

Zone	Pre-hist. Features	Prehist. Structures	Prehist. Struct./Features	Provenience Class: Lithic Scatter	Ceramic Scatter	Lithic Ceramic Scatter	Historical Fea/Scat	Historical Struct.	TOTALS *
A	6.28	0	0	1.79	0	2.69	0	0	10.76 (172.19)
B	1.61	0.32	0.32	0	0	0.64	0	0	2.89 (46.26)
C	2.23	0.50	0.99	0.50	0.08	0.72	0.14	0.11	5.25 (84.07)
D	0.14	0.11	0.14	0.07	0	0.21	0	.12	0.88 (14.07)

* Densities per 640 acres given in ( ).

surveyed in the order they were initially chosen, which means that particular features may be over or under represented in each sample. In addition, the sampling fraction was determined with single and multi-zone quadrats (as described above) so that the actual acreage surveyed in each zone varies. Comparison of the samples is nonetheless instructive for assessing different sampling fractions. Due to the very low amount of acreage in the initial Zone B sample, comparisons will not be attempted with samples of this zone.

The densities of prehistoric features in Zone A are radically different between samples, due to the fact that while 15 and 19 percent of Zone A were surveyed with three and six percent samples, respectively, these fractions comprise only 36.6 and 44.6 acres. In all likelihood, more than half (or 100 + acres) would probably have to be surveyed before a representative picture of the archeological remains in Zone A is obtained. The percentage of Zone D surveyed in the three and six percent samples is 4.4 and 7.86 percent, or 605.9 and 1136.90 acres, respectively. Feature and structure densities differ appreciably between these two samples. All densities are lower in the six percent sample of Zone D indicating inclusion of more area without cultural remains in the larger sample.

When translated into features per square mile, sample densities for prehistoric features are approximately eight and one respectively, in Zone D using three and six percent samples. If both samples were randomly selected, this difference implies that a higher sampling fraction (greater than 7.86 percent) is needed to obtain a representative sample from Zone D. Zone C samples, at a three and six percent sampling rate, are 728.5 and 1454.0 acres, respectively. The density of prehistoric structures is higher and that of features lower in the six percent sample than in a three percent sample in Zone C. While sample densities do differ, their relative similarity (if they were random samples) may point to the adequacy of a 5.3 percent sampling fraction for Zone C.

Certain types of remains, especially very large architectural units with more than 35 rooms were not documented with a six percent sample (Table 4.19). Given the very high densities of remains in Zone C, these types of features may be more realistically detected through means supplemental to a sample survey, for even though large architectural complexes may be documented by raising the sampling fraction to 25 percent, for example, a higher sampling fraction would also necessitate recording a tremendous number of other more mundane features already well represented.

Table 4.19: Prehistoric Structural Features in 6% Sample

Structures				Kiva	Total Room	Total Structures
Room Frequency						
1	2-5	6-14	15-35			
12	34	10	4	3	258	60

The strength of the above density calculations can be assessed only for sample units in Zones C, C/D, and D (Table 4.20), zones for which the number of surveyed sample units is high enough for statistical evaluation. This assessment relies on a nonrandom sample, i.e. one that under represents structural proveniences in Zone C, which was sampled at a 5.3 percent rate. Casual reconnaissance of the area, indicates that large architectural sites in Zone C, although relatively rare, are not unique. These sites occur at relatively low frequencies when compared with one- to four-room masonry units within the inventory areas. A six percent sampling rate, and possibly 10 percent rate as well, will not adequately document these larger architectural sites.

At a 95 percent confidence interval, the number of sites (as recorded by this survey) in Zone C can be expected to range between one and four, with an average of 2.6, per 40-acre survey unit (Table 4.20). However, sites are frequently composed of spatially segregated complexes features and structures and are thus highly variable in content. It is, therefore, more instructive to determine the number of expected proveniences per survey unit (Table 4.20), since proveniences can be as spatially extensive as "sites."

The average number of proveniences expected in Zone C is eight. Proveniences are less densely distributed in Zones C/D (bottomland-

Table 4.20: Summary Quadrat Survey Statistics for Zones C, C/D, and D.			
SITES			
Type of Statistic	**Zone C (n=15)**	**Zone C/D (n=35)**	**Zone D (n=9)**
Mean	2.66	1.17	0.66
I.R.	1.16-4.17	1.19-2.23	0.12-1.2
PROVENIENCES			
Type of Statistic	**Zone C (n=15)**	**Zone C/D (n=35)**	**Zone D (n=9)**
Mean	5.00	2.71	0.77
I.R.	1.45-8.54	1.61-3.81	0.03-1.52

upland margins) and D (alluviated flats). These figures translate into 136, 60, and 24 proveniences per section for Zones D, C/D, and D, respectively.

Two recommendations directed toward increasing sample precision and accuracy can be made. First, several strategies for detecting large architectural sites might be implemented in conjunction with a sample survey. These methods would increase the number of cases available for study and thus the accuracy of the survey sample estimates. One strategy would be to increase survey acreage for these types of remains alone. This could be accomplished by using very expedient recording procedures for archeological remains encountered that do not meet targeted criteria, such as an estimated room count of over 15. Survey units are thus given intensive coverage with in-field data recording techniques focused on targeted remains. However, widely-spaced transects, i.e. 200 m intervals, walked by a single surveyor (as used in the previous BLM transect surveys of the area) are not desirable for locating and recording complex architectural features since single crew members cannot adequately record the full range of data necessary for documentation of large architectural sites. Alternatively, larger amounts of acreage can be examined for monumental architecture through photo interpretation of large-scale aerial photographs and aerial reconnaissance by low-flying aircraft. The advantage of the latter method is that more area can be examined in a shorter period of time.

A second recommendation involves a post-inventory stratification of topographic Zone C. Quadrat survey statistics suggest that archeological remains in Zone C may be the most diverse and exhibit the widest range of projected provenience densities in relation to other zones. Accordingly, in order to increase the precision of projections based on a survey sample, the diversity in Zone C could be reduced by subdividing the zone into areas with smaller internal variance. This could be accomplished upon completion of the 10 percent sample survey using environmental or other parameters mapped and coded for the SACA landscape within the existing framework of a geographic information system. Over two-thirds of the 10 percent sample will be included in Zone C and this zone will yield the highest overall frequencies of proveniences. The advantage of the post-inventory stratification and further study of this zone is an increase in the precision of density projections for large areas that are also the most likely candidates for coal leasing.

Chapter 5

Ceramic Assemblages

Description and analysis of the ceramics sampled in the SACA Moderate Production Area are presented in this chapter. Chapter sections include a review of previous ceramic studies in the Quemado region, description of in-field analysis techniques, and an analysis of the ceramics at sites in the Moderate Production Area. A regional ceramic typology provides the framework for a chronological ordering of ceramic assemblages, and ceramic assemblages assigned to chronologically ordered prehistoric occupation periods are compared. Assemblage variability among periods of occupation at structural and nonstructural assemblages assigned to these periods are also compared on the basis of ware and vessel form proportions. Five sets of proportions include sherd proportions in (1) decorated and utility ware categories, (2) bowl and jar sherd (all types and wares) categories, (3) decorated bowl and jar sherd categories, and (4) proportions of redwares and whitewares in decorated ware assemblages, and of (5) graywares and brownwares in utility ware assemblages.

Previous Ceramic Studies in the Quemado Region

Of particular importance to the ceramic studies conducted for this project are the surveys and excavations of the Peabody Museum's Upper Gila Expedition (Brew and Danson 1948; Bullard 1962; Danson 1957; McGimsey 1980; Smith 1973) and studies undertaken by the Chicago Natural History Museum (Martin et al. 1950, 1952, 1956, 1957). In addition, a number of recent cultural resource management survey inventories and excavations (Eck 1982; Elyea 1983; Hogan 1983; Hunter-Anderson 1978; Moore et al. 1983; Westfall 1981) have identified sequences or groups of associated ceramic wares and types within the region. Comparison of previously documented ceramic groupings with the ceramic assemblage data obtained from the SACA provides additional support for some groupings and calls others into question. The primary ceramic ware and type associations identified by previous ceramic studies and the interpretations of prehistoric archeological "cultures" or behaviors facilitated by these associations are reviewed below.

Upper Gila Expedition Surveys and Excavations

Some of the earliest work devoted to identifying ceramic variability within the immediate project area was accomplished in conjunction with the Peabody Museum's Upper Gila Expedition. Initial reconnaissance by the expedition in the Zuni Salt Lake area (Brew and Danson 1948) noted that gray and brown utility ware occurred together at certain sites. This association was interpreted as representing important "intercultural relationships" between Anasazi and Mogollon groups within the Quemado region. Identifying the economic and social bases of these inferred relationships became a major theme of subsequent Upper Gila Expedition projects.

Under the direction of E.B. Danson (1957), the Upper Gila Expedition conducted a baseline survey in a large region of west-central New Mexico which included reconnaissance and intensive survey in the Mariana Mesa-North Plains area. Based on this survey, Danson

(1957:69) observed that Pueblo I and Pueblo II period sites in this area contain higher proportions of graywares than of brownwares compared to sites located to the south of the Quemado region. In addition, the ceramics Danson considered "intrusive," or of nonlocal manufacture, in the more southerly regions of west-central New Mexico, such as his Tularosa-Apache Creek area (Brew and Danson 1948:215), were the decorated types observed to occur at highest frequencies at sites in the Mariana Mesa area. The ceramic type designated "Reserve-Tularosa-type Black-on-white" by Danson (1957:69) was noted as rare or absent in the Mariana Mesa area. In the latter area, the locally made decorated wares were believed to resemble the Reserve-Tularosa type in design, but the slips were judged to be thinner and to resemble more closely those of Puerco Black-on-white (Danson 1957:70). Higher proportions of brown than of gray utility wares were also observed at Pueblo III period sites (Danson 1957:71-74) which yielded Tularosa Black-on-white and Klageto Black-on-white types.

Danson (1957:88-93) discusses a number of questions and problems concerning the ceramic associations identified during his survey. He questions whether the smudged fillet-rim brownwares present at Mariana Mesa sites were locally manufactured or whether they occur at these sites as a result of trade with areas in the Mogollon Mountains to the south. In comparison with gray utility wares, most brownwares exhibit superior craftsmanship with respect to finer corrugations and surface finish. Danson (1957:89) believed that the quality of brownware construction and the apparent contemporaneity of neck-corrugated brownwares (dated as early types in the south) with plain graywares reinforced the hypothesis that the inception of pottery manufacture and the use of neckbanding and corrugations began earlier in the south than in the north (Haury 1950:80-83).

It was further concluded that differentiating specific areas of brownware manufacture was not possible through petrographic analysis of the sand and crushed rock temper. These tempering materials are abundant throughout the region and no distinctions among areas could be identified. Subsequent petrographic analysis (Crown 1980:5) of brownware temper has presented similar conclusions.

Among the decorated wares, Danson (1957:90-93) addresses the problem of where Reserve and Tularosa Black-on-white were locally made. While no definitive answers resulted from the Upper Gila Expedition (UGE) survey, the data indicated local manufacture of these two pottery types in the Reserve, Tularosa, and Apache Creek regions, to the south of the Mariana Mesa sites. Reserve Black-on-white and Puerco Black-on-white were concluded to be very similar types, with design, slip, and surface finishes in some instances indistinguishable between the two. Generally, the Pueblo II period Cibola whitewares, including Puerco, Escavada, and Gallup Black-on-white types and Reserve and Tularosa Black-on-white types are all "variants of the same basic wares" (Danson 1957:91). Slips on these types were seen as thinner and less well polished in the north than in the south. Several other observations were made from these data: (1) rate of change in design styles and surface finish is quite gradual, thus making it difficult to distinguish type variants, i.e. early Tularosa B/W from late Reserve B/W, and (2) a late variant of St. Johns Polychrome, Springerville Polychrome, is most often associated with Klageto B/W on post-A.D. 1250 sites (Danson 1957:93).

Bullard's report on the excavations at the Cerro Colorado site (1962) provides a general review of pottery recovered from the various proveniences at this site with a more detailed study of the ceramics made by Wasley (1959). Four ceramic complexes spanning Basketmaker III through late Pueblo II times were identified at the Cerro Colorado site on the basis of stratigraphic positioning and associations with architectural features. Basketmaker III ceramic assemblages dating from A.D. 500 to 750 were identified in the lowest levels of the pithouse features, and were composed of Lino Gray, Lino Red Wash, and La Plata Black-on-white, along with a small percentage (five to 10 percent) of Alma Plain and San Francisco Red. Bullard assumed that the latter brownwares were not locally made, but were instead traded in from the San Francisco and Mimbres drainages. A smaller percentage of Little Colorado brownwares, including

Woodruff Brown, Forestdale Smudged, and Forestdale Red, were also recovered. Of note in Basketmaker III assemblages were two types which share both brown and gray ware traits. These types were described by Wasley as Cerro Colorado Plain, a combination of Alma and Lino characteristics, and Cerro Colorado Red, a grayware paste with red slip.

The second ceramic assemblage was attributed to a late Pueblo I period occupation dating in the late A.D. 800s. This assemblage was associated with structure 201A, a circular pithouse in the 200 group. Included in this assemblage are a high percentage of Mogollon brown and decorated wares, mainly Three Circle Neck corrugated, Three Circle Red-on-white, Mogollon Red-on-brown, Alma Neck-banded, San Francisco Red, and Alma Plain. Cerro Colorado Plain and Forestdale Smudged were also included. Lino Gray and a few sherds of White Mound Black-on-white were the only graywares in the Pueblo I assemblage. The proportions of brownwares and graywares in this assemblage are nearly 80 percent and 20 percent respectively.

The third ceramic complex is an early Pueblo II assemblage dating from the mid-A.D. 900s and is composed primarily of Cibola wares including Red Mesa Black-on-white, Kiatuthlanna Black-on-white, Puerco Black-on-white, and Kana'a Gray. The only brownware type in the assemblage is Three Circle Neck corrugated. This early Pueblo II ceramic complex is associated with structures 201C and 410, both rectangular pithouses.

The final ceramic complex is a late Pueblo II assemblage dating between A.D. 1000 and 1100. Socorro Black-on-white, Reserve Black-on-white, and Puerco Black-on-white, and plain and indented corrugated wares (gray or brown not delineated) make up the group. This ceramic complex is associated with structure 201B, a D-shaped kiva.

The Williams Site, excavated in 1951 as a part of the UGE, and reported by Smith (1973), has yielded pithouse structures which date from the mid-A.D. 800s to the early 1000s, and a masonry pueblo with tree-ring dates from the mid-A.D. 900s to the early 1000s. Eighty-six percent of the sherds associated with the pithouses are Mogollon brownwares, and 14 percent are Anasazi wares, which include mostly decorated types. The assemblage associated with the pueblo structure has a somewhat lower ratio of Mogollon to Anasazi wares, with almost all of the Anasazi wares being decorated. In the masonry pueblo 77.4 percent of the assemblage is Mogollon and 22.6 percent is Anasazi. Smith believed that the increase in the ratio of Anasazi to Mogollon wares indicates a "much more significant Anasazi influence in the later than in the earlier period" (Smith 1973:27).

It is interesting to note that almost all of the pottery types represented at the site are found in both occupations. Kiatuthlanna Black-on-white was the only type not found in the pithouses, and Mimbres Boldface Black-on-white was the only type not found in the pueblo. The Cibola whitewares present (Kiatuthlanna Black-on-white and Red Mesa Black-on-white), comprising roughly 88 percent of the decorated wares in the entire site assemblage, were identified by Smith as "Exotic Black-on-White." The remaining 22 percent of the decorated wares are Reserve Black-on-white and Mimbres Boldface Black-on-white.

Smith (1973:27-34) provides an exhaustive list of attributes for Alma Plain and San Francisco Red which includes descriptions of surface finish, temper types, surface colors, and paste colors for these types. The textured brownware types are described and illustrated with the few gray corrugated sherds described and identified as wares from the Little Colorado tradition.

The excavation and analysis of seven sites which include a Pueblo I period jacal structure, three Pueblo II period structures of varying sizes and construction styles, and three Pueblo II-III period pueblo complexes is reported by McGimsey (1980). The ceramic analysis employed a very detailed complex of attributes which includes paste characteristics, construction techniques, slip, paint, surface finish, and vessel shape and size. The method of tabulating the variable states of each of these attribute categories, unfortunately, differs among individual assemblage analyses. While limited discussions of the pot-

tery at individual sites are provided, there is no integrated analysis or discussion, making comparison of attributes among assemblages difficult. Comparisons of excavated assemblages are made here on the basis of ware and type percentages among the seven assemblages:

(1) **Site 486**, the earliest structure excavated, was dated to between A.D. 850 and 900 through cross-dating with the ceramics, since no absolute dates were recovered. Even though sherds were not classified into types in the coded table of ceramic attributes, the majority of the sherds in the assemblage appear to be Red Mesa Black-on-white, with a smaller proportion being Kiatuthlanna Black-on-white. A few Mimbres Boldface Black-on-white sherds are also present.

A distinctive local variation of white slip application, consisting of applying slip over the entire exterior of all bowls was noted for most sherds at this site. In the utility ware category, brownwares make up 70 percent and graywares comprise 30 percent of the assemblage.

(2) **Site 188** is a small jacal structure from which a single three-ring sample dating to A.D. 1071 (cutting date) was recovered. This date and the high proportion of Red Mesa Black-on-white in the assemblage suggest use of the location ended around A.D. 1075. No beginning date for use of this site was determined. The decorated pottery is listed as being primarily Red Mesa Black-on-white, but one of the illustrated sherds (McGimsey 1980:Figure 101) and the dominant decorative mode key more closely resemble the dogoshi style Gallup Black-on-white. In addition, the Gallup Black-on-white type is in accordance with the A.D. 1070 tree-ring date, which is somewhat late for Red Mesa Black-on-white. Brownwares make up 56 percent of the utility ware assemblage and graywares 44 percent.

(3) **Site 601** is a small masonry pueblo believed to have been occupied during the period A.D. 1000 to 1100, based on ceramic cross-dating. The decorated pottery is primarily Red Mesa Black-on-white or late Escavada Black-on-white, but as with Site 188, illustrated sherds (McGimsey 1980:Figure 97) and one of the decorative mode keys strongly suggests the assemblage may also include Gallup Black-on-white. A local variation of white slip on bowl exteriors was noted. In the utility ware group, roughly 58 percent of the ceramics are graywares and 42 percent are brownwares.

(4) **Site 494** is comprised of two small masonry roomblocks and a square kiva. The ceramic assemblage and architecture suggest a late Pueblo II to early Pueblo III occupation; a single tree-ring sample dated to A.D. 1191. A table of ceramic types was provided for this site: 81 percent Reserve Black-on-white, four percent Puerco Black-on-white, two percent Tularosa Black-on-white, and one percent Gallup Black-on-white. In addition, 12 percent of the assemblage is Wingate Black-on-red (which includes both Puerco Black-on-red and Wingate Black-on-red types).

The high percentage of brownwares, 97 percent, as opposed to grayware, three percent, and the lack of polychrome ceramics, distinguish the ceramic assemblage at this site from those of the other sites excavated by the Upper Gila Expedition.

(5) **Site 481** is a moderate sized, multicomponent masonry pueblo and kiva which resulted from several construction sequences. The nine tree-ring dates recovered from the structure and kiva indicate an occupation spanning from A.D. 1151 to 1268, or the late Pueblo II to mid-Pueblo III periods. The decorated pottery types present (McGimsey 1980:187) substantiate these dates. Tularosa Black-on-white makes up 33 percent of the as-

semblage, Reserve Black-on-white 25 percent, Wingate-Puerco Black-on-red 17 percent, St. Johns Polychrome 10 percent, Gallup Black-on-white nine percent, and Red Mesa Black-on-white six percent. Sherds in the utility ware category include 93 percent brownwares and seven percent graywares.

(6) **Site 143** is a large complex of at least five separate masonry roomblocks, kivas, and a large circular ceremonial feature. This feature, interpreted as a dance plaza, was the only structure excavated; no tree-ring dates were recovered during the excavations. The architectural styles and ceramic assemblage indicate a late Pueblo III occupation at this site, dating in the A.D. 1200s. Tularosa Black-on-white dominates the decorated ware ceramic sample, with 43 percent, followed by 38 percent St. Johns Polychrome, 14 percent Reserve Black-on-white, three percent Wingate Black-on-red, one percent each Socorro Black-on-white and Puerco Black-on-white, and less than one percent each Red Mesa Black-on-white, Houck Polychrome, and Querino Polychrome. The utility wares at this site were not systematically recorded, but limited observations indicated they are similar to those at Site 616.

(7) **Site 616**, the final site excavated in the Mariana Mesa Project, is a large masonry and adobe compound. The eight three-ring samples recovered from rooms and a kiva date from A.D. 1142 to 1286 and suggest an early to late Pueblo III occupation at this site; however, a late Pueblo II ceramic component is indicated as well (McGimsey 1980:42). The pottery type proportions in the 616 assemblage are as follows: Tularosa Black-on-white 64 percent, 13 percent St. Johns Polychrome, 10 percent Wingate-Puerco Black-on-red, five percent each Heshotuathla Polychrome and Reserve Black-on-white, two percent Pinedale Polychrome, one percent Springerville Polychrome, and less than one percent each Wingate Polychrome, Pinedale Black-on-red, Klageto Black-on-yellow, Klageto Polychrome, Showlow Polychrome, and Querino Polychrome. The brownwares make up 96 percent of the utility ware assemblage and graywares make up 4 percent. Of particular interest is the Tularosa Black-on-white type category described for Site 616 (McGimsey 1980:125-126). A number of sherds illustrated (McGimsey 1980:Figures 45, 47), and at least two of the decorative mode keys (McGimsey 1980:110-112) strongly resemble or suggest Klageto Black-on-white type. Klageto Black-on-white is a late variant of Tularosa Black-on-white, and examination of the coded tables (McGimsey 1980:Table 1) indicates a high percentage of this type date (1190p-1286vv) at the site.

Other Surveys and Excavations

The Sandstone Hill Pueblo was excavated by the Albuquerque Archeological Society and is described by Barnett (1974). The site is composed of a masonry roomblock and ramada area. The ceramic assemblage suggests that the site was probably occupied from A.D. 1150/1200 to A.D. 1315/1325. The most frequently occurring decorated ware is Tularosa Black-on-white. It is difficult to determine which undecorated types are brown wares and which are gray, since the sherds are primarily described by surface texture. It appears that the grayware and brownware proportions are roughly 11 percent and 89 percent respectively. Barnett believes that Puerco Black-on-white and its Gallup Black-on-white variety, Springerville Polychrome, Fourmile Polychrome, and the gray utility wares were probably imported into the site area, because of their low frequencies in the assemblage. Decorated wares in the ceramic assemblage at this site are present in higher frequencies than are utility wares.

Of the other studies conducted in areas surrounding the SACA, several have included specific studies which provide a framework for interpretation of temporal sequences of ceramics in the Quemado region. Excavations by the Chicago Natural History Museum at

three Reserve Phase sites (Martin and Rinaldo 1950) in the Pine Lawn Valley provide thorough descriptions of an indigenous pottery type, Reserve Black-on-white, the most frequently occurring decorated ware recorded at sites in the SACA. Excavations undertaken in the early 1950s at Tularosa Cave have also aided in substantiating the relative temporal sequence of northern Mogollon pottery types (Martin et al. 1952). The work at Tularosa Cave provided a stratigraphic sequence spanning pre-pottery levels, i.e. those containing plain wares and those yielding Reserve Black-on-white and Tularosa Black-on-white. In the late 1950s, Martin and others (1956, 1957) excavated five late Tularosa Phase sites in the Reserve and Apache Creek Areas. This work resulted in a comprehensive description of Tularosa Black-on-white, the second most abundant decorated type in the SACA.

The surveys and excavations in the Cebolleta Mesa region by Ruppe and Dittert (1952, 1953) are also important for interpreting the ceramic variability in this study area, since the presence of gray and brown wares at the same sites is repeated in this area through Pueblo III times. Similar to Danson's interpretations of Mariana Mesa ceramic assemblages, normative explanations involving diffusion and/or direct contact of several different cultural groups in the Cebolleta Mesa region were given as alternative explanations for assemblage content.

Westfall (1981) reports on the excavation of 14 sites located north of St. Johns, Arizona. The only two sites containing substantial ceramic assemblages are Pueblo II-III period pueblos. In the ceramic chapter by Crown (Westfall 1981:233-290), decorated wares at these sites were categorized by style rather than by ceramic type, although in portions of the report "style" appears to be synonymous with "type."

On these two Pueblo II-III sites, the most abundant decorated wares include Tularosa Style Black-on-white and Reserve Style Black-on-white, with lesser amounts of Puerco Black-on-white, Escavada Black-on-white, and Snowflake Black-on-white. The White Mountain redwares include Wingate Style Black-on-red, Wingate Polychrome, and Puerco Style Black-on-red. Grayware and brownware proportions are 65 percent and 33 percent at one site, and 81 percent and 18 percent at the other site. Bowl sherd and jar sherd proportions average 35 percent and six percent respectively in these two assemblages, which also include a low percentage of ladles.

In an attempt to understand the causes for the occurrence of brown and graywares at the same site, Crown (1981:256-269) describes and compares technological, stylistic, and functional attributes of the utility wares. Of particular significance are the petrographic analyses of tempering materials in the gray and brown wares, which concluded that graywares are homogeneously tempered with crushed sherd and quartz and brownwares are more heterogeneous with quartz, chert, sherd, plagioclase, basalt, and muscovite tempering materials (Crown 1981:269). Based on the homogeneity of grayware tempering materials, and the relative abundance of graywares over brownwares, the graywares are interpreted as local products. The heterogeneity of the brownware temper and relatively low numbers of brownwares in assemblages led Crown (1981:269) to view the brownwares as nonlocal products.

Crown (1981:237-240) resolved the difficulty in distinguishing Reserve Style ceramics from Tularosa Style ceramics by using a Reserve-Tularosa intermediate category. In addition, a brown/gray corrugated type was identified. Similar problems were encountered with SACA site assemblages resulting in the use of a Reserve/Tularosa Black-on-white category and a Gray/Brown Indented Corrugated category.

The Yellowhouse Dam Project (Hunter-Anderson 1978) involved a survey of an area just east of Zuni, New Mexico. This report does not contain site specific information on ceramic assemblages; however, a series of Ceramic Groups and Complexes were defined for the region. The Ceramic Groups, A through Q, represent "clusters of pottery types recurring in characteristic frequencies in the study area" and are based on both presence/absence and relative proportions of types. The Ceramic Complexes, 1 through 27, are finer clusterings of the pottery types and are based on relative

proportions of types. The Ceramic Groups include Basketmaker III period assemblages, those attributed to prehistoric Pueblo periods, in addition to present-day Zuni potters. Ceramic Groups A through I follow general stylistic changes through time from Basketmaker III up to late Pueblo III times, and thus are probably applicable to areas outside the Zuni region. Ceramic Groups J through Q appear to be quite specific to the Yellowhouse area.

A total of 48 sites or components with ceramics have been recorded by four cultural resource management surveys (Eck 1982, Elyea 1983; Hogan 1983; Moore et al. 1983). Several different methods were used to record the pottery on these four projects. Eck (1982) chose to present the ceramic data in "descriptive terms" rather than to use pottery types; however, he does use Marshall's Ceramic Groups (as discussed in Hunter-Anderson 1978) which are based on standard ceramic typology. Moore and others (1983) also use a combination of standard typology and descriptive terms. Unfortunately, these descriptive terms, such as "sand tempered whiteware," used by both Eck and Moore are relatively vague.

While it is informative to record general ware type descriptions, i.e. gray, brown, white, or red wares, tempering materials are of little use in distinguishing identifiable or datable pottery types within these wares (Bullard 1962; Danson 1957; McGimsey 1980; Smith 1973). Recording paint type is also of little value for helping to identify wares since, with the exception of several rare types in this region, mineral paint is present on all examples. Moore employs very useful design descriptions such as "Red Mesa style," "White Mound style," or when known, the ceramic type is listed. Eck's design descriptions are generalized, i.e. "solids, hatched, corrugated (1982)." Elyea (1983) uses a ceramic style horizon classification based on Marshall's Ceramic Groups (Hunter-Anderson 1978). In addition, standard pottery types are tabulated, making this report very useful for comparing the ceramic assemblages with those from other excavated and recorded sites in the area.

Of the 48 sites recorded in the cultural resource management surveys, only one Basketmaker III component was identified. Other components inventoried include eight Pueblo I-II period components, 27 early and late Pueblo II period sites, nine Pueblo II-III components, two Pueblo III period components, and one site which spans the period from Pueblo I through Pueblo III. Elyea (1983:Table 1) tabulates the number and proportions of graywares and brownwares recovered from all three OCA surveys. Utility ware assemblages at previously recorded Pueblo I-II period sites vary, ranging from those composed exclusively of gray or brown ware to assemblages with almost equal proportions of each. These ceramic samples are all small, e.g. three containing less than 15 sherds each. At early Pueblo II sites, the proportions of gray and brown wares are more consistent, averaging 80 percent and 20 percent respectively. In larger Pueblo III samples the gray and brown ware proportions are quite diverse.

In summary, the surveys and excavations carried out by the UGE have had the greatest influence on subsequent ceramic studies in the Quemado region. Danson's (1957) survey laid the framework for future ceramic studies by not only identifying and describing the local pottery type sequences, but by recognizing a number of research problems having to do with these assemblages. He focused on the issue of grayware and brownware sherds co-occurring on sites, on the identification of the Reserve Black-on-white and Tularosa Black-on-white types and their areas of local manufacture and trade, and on associations and variations within indigenous and nonindigenous pottery types in the region. Bullard's (1962) excavations at Cerro Colorado firmly established the presence of Basketmaker III and Pueblo I occupations in the region and identified the characteristic ceramic assemblages for these time periods. Smith's work at the Williams Site (1973) furthered the hypothesis presented during the earlier UGE studies that the influence of Anasazi culture increased through time. McGimsey's excavation data (1980) substantiated some of Danson's ideas of ceramic chronology and demonstrated, contrary to early ideas, that Reserve Black-on-white and Tularosa Black-on-white were indeed locally manufactured types in the Quemado region.

In-Field Ceramic Recording Methods

The in-field data recording methods for documenting SACA prehistoric ceramics were designed to provide a data base for analyses of ceramic assemblage content and structure. These analyses emphasize identification and description of ceramic assemblages segregated by temporal period using tally sheets incorporating ceramic type and vessel form categories. The data coding format shown in Figure 5.1 incorporates general provenience categories and several sample types and regional ceramic typologies. Descriptions of these categories, pottery types, vessel form categories, and dating considerations are given below.

General Provenience Categories

The types of features associated with ceramics were used to categorize ceramic assemblages into those from structural and nonstructural proveniences. A more detailed description of different architectural forms is presented in Appendix II. The seven criteria of features used to assign a sample to a general provenience category are described below:

1. **Roomblocks** are individual multi-room units which can co-occur with other such units. Sampled roomblocks contain from two to 45 rooms. Most are composed of 15 or fewer rooms; only five of the roomblocks recorded were estimated to have 20 or more rooms.

2. **Pit structures** occur as isolated features or in association with surface features and are visible as depressions on the site surface.

3. **Plazas/great kivas** form a category of large circular depressions integrated into roomblocks or detached from surface structures.

4. **Midden deposits** are accumulations or concentrations of artifacts, ash, building rubble, and other refuse deposited within a discrete area. These deposits can be slightly to moderately mounded, with soil texture and color distinct from the surrounding area.

5. **Refuse scatter** is applied to surface artifact distributions with no discernible concentrations or distinct boundaries. The three types of refuse scatters recognized are ceramic and/or lithic scatters, ceramic/lithic scatters associated with features, and ceramic/lithic scatters associated with structures.

6. **Earthworks** were located at one site, LA 48030, and consist of linear mounds of earthen fill.

7. The **exposed fill** of some single rooms within vandalized roomblocks also yielded ceramic data.

Sample Types

In-field ceramic data collections procedures employed four types of samples: (1) bounded or grid samples, (2) samples of 50 percent of the observed sherds at a site, (3) inventories of all of the observed sherds at a site, and, in a few instances, (4) unstructured "grab" samples. Bounded samples were obtained from sites or proveniences with features, such as midden deposits, with high surface artifact densities. Bounded samples include grids ranging in size from 1x1 m to 10x10 m. The grid size selected was one which would recover data on a minimum of 50 sherds. Samples of 50 percent of the observed sherds were taken at sites with moderate artifact densities including some roomblocks and refuse scatters. These samples recorded ceramics on half of the site surface. All of the observed sherds were recorded at sites with low artifact densities or with relatively, small, compact artifact distributions. Unstructured samples in which both the range of types and type counts were noted in a purely subjective manner were also taken.

The type of sampling procedure chosen and the location of samples were dependent primarily on the number and size of architectural and other features at sites and the

CERAMIC DATA CODING FORMAT

Column	Variable
1 - 4	Site Number
6	General Provenience
7 - 8	Provenience Unit Number
9	Sample Type Code
11-12	Ceramic Type Code
13-15	Bowl Frequency
16-18	Jar Frequency
19-20	Ladle Frequency
21-22	Smudged sherd frequency (bowl form assumed)
23-24	Frequency of indeterminate forms
26-33	Date for each provenience range or 999 for pre-1000 and 1000 for post 1000 AD
35	Association (1=associated w/site, 2=unknown association)
36-39	Unit Letter Code and Unit Number
40-41	10 Number

CODES

GENERAL PROVENIENCE

1= Roomblock	6= Trash mound
2= Pitrooms/pitstructures	7= General refuse scatter
3= Plazas	8= Hearth (specific association)
4= Ramada/ door work area	9= Room " "
5= Dance plaza	

PROVENIENCE UNIT NUMBER

Consecutive Provenience #, correlated with site map

SAMPLE TYPE CODE

1= 1x1 grid	5= 5x5 grid
2= 2x2 grid	6= unstructured sample
3= 3x3 grid	7= other
4= 4x4 grid	8= 50% of observed
	9= all observed

CERAMIC TYPE CODES

Code	Type
BROWNWARES	
01	Plain Brown
02	Polished Brown
03	Neckbanded
04	Plain Corrugated
05	Indented Corrugated
06	Patterned Corrugated
07	Tooled Corrugated
08	Fillet Rim
09	Unidentified Brownware
10	Brown/Gray Corrugated
GRAYWARES	
11	Lino Plain
12	Kana'a Neckbanded
13	Play Gray (body sherd)
14	Plain Corrugated
15	Clapboard Corrugated
16	Indented Corrugated
17	Obliterated Corrugated
18	Unidentified Grayware
43	Neck Corrugated
49	Lino Red Wash
WHITEWARES	
19	Reserve B/W
20	Tularosa B/W
21	Reserve-Tularosa B/W
22	Unidentified Whiteware (body sherd)
23	Unidentified Solid B/W
24	Unidentified Hatchure B/W
25	Lino B/G
26	LaPlata, Kana'a, Whitemound B/W
27	Kiatuthlanna B/W
28	Red Mesa B/W
29	Escavada B/W
30	Puerco B/W
31	Gallup B/W
40	Socorro B/W
41	Mimbres B/W
45	Three Circle B/W
47	Cheap Johns B/W
50	Late Tularosa B/W

Code	Type
REDWARES	
32	Puerco B/R
33	Wingate B/R
34	Wingate Polychrome
35	St. Johns B/R
36	St. Johns Polychrome
37	Springerville Polychrome
38	Unidentified White Mountain Redware
39	Unidentified White Mountain Polychrome
42	Local Plain Redware
46	Mogollon B/R
48	San Francisco Redware
OTHER	
44	Ware and type Unspecified

Figure 5.1: Ceramic coding format.

presence of spatially discrete scatters thought to contain different ceramic type inventories. All ceramics at scatters without architecture and isolated occurrences comprising from one to 15 sherds (most representing a single vessel) were recorded as were ceramics at a majority of small architectural sites for which sherds were perceived to represent a single temporal component.

Features at these sites include several pit structures or slab-based rooms and associated scatter and pueblos without middens. Most midden deposits, especially at larger sites with several proveniences, were sampled with grids. Grid or "all-observed" samples were recorded from roomblock surfaces at these sites. Some large architectural features with high surface densities were also sampled at a 50 percent rate.

Ceramic Typology

Ceramics identified by inventory and reconnaissance surveys include decorated whitewares, decorated Mogollon wares, White Mountain redwares, brownwares, and graywares. Sampled ceramics within these groups were assigned to type categories as defined by generally accepted ceramic typologies for the region. Table 5.1 lists the major references used to provide type descriptions. These descriptions, abstracted below, include additional data gained from recent research within the Quemado area and gathered by this project.

Table 5.1: Ceramic References

Decorated Whitewares		
	Lino Black-on-gray	Hargrave 1932
	La Plata/Kana'a/ White Mound Black-on-white	Kidder and Guernsey 1919
		Cibola Whiteware Conf. 1958
		Haury 1936
	Kiatuthlanna Black-on-white	Cibola Whiteware Conf. 1958
	Red Mesa Black-on-white	Colton 1953
	Puerco Black-on-white	Colton 1953
	Escavada Black-on-white	Colton 1953
	Reserve Black-on-white	Martin and Rinaldo 1950
	Socorro Black-on-white	Mera 1933
	Gallup Black-on-white	Colton 1953
	Tularosa Black-on-white	Rinaldo and Bluhm 1956
	Tularosa-Klagetoh Black-on-white	Smith 1971
Decorated Mogollon Wares		
	Mogollon Red-on-brown	Haury 1936
	Three Circle Red-on-white	Haury 1936
	Mimbres Black-on-white	Cosgrove and Cosgrove 1932
		LeBlanc and Whalen 1980
	San Francisco Red	Haury 1936
White Mountain Redwares		
	Puerco Black-on-red	Carlson 1970
	Wingate Black-on-red	Carlson 1970
	Wingate Polychrome	Carlson 1970
	St. Johns Black-on-Red	Carlson 1970
	St. Johns Polychrome	Carlson 1970
	Springerville Polychrome	Carlson 1970
Utility Wares		
	Mogollon Brownwares	Colton and Hargrave 1937
	Anasazi Graywares	Windes 1977
	Mogollon/Anasazi Utility Ware	Crown 1981

The following four attributes are most useful for identifying pottery types in the Quemado region: (1) surface finish, (2) tempering material, (3) decoration, and (4) design layout. Surface finish on decorated wares refers to presence/absence or degree of polishing, slip characteristics, color, and any other distinguishing treatments particular to a specific type.

On utility wares, surface finish refers primarily to various treatments of unobliterated coils. Tempering materials are listed based on their identification in the literature since no temper analyses were attempted on this project. Description of decoration identifies the paint characteristics, individual design elements, and design systems or styles. Layout refers to the placement of these design elements on the vessel. These descriptions are not meant as complete type definitions, but are offered to help clarify the use of the ceramic typologies.

Decorated whitewares

➡Lino Black-on-gray

Surfaces: Scraped and floated but not slipped or polished, with temper particles protruding through both surfaces.
Temper: Coarse quartz sand.
Decoration: Carbon painted designs composed of narrow lines which are frequently ticked or fringed, solid or open triangles with pendant dots; dot-filled spaces with narrow framing lines.
Layout: Designs wander across vessel, sometimes pendant to the rim; rarely in encircling bands.

➡La Plata/Kana'a/White Mound Black-on-white

This category combines several temporally, stylistically, and technologically similar types.

Surfaces: White to gray surface colors with protruding temper and either no slip, a float, or a thin white slip with smooth, light polish.
Temper: Coarse to medium sand.
Decoration: Mineral painted designs including filled triangles and bands with solids outlined with parallel, barbed, or flagged lines.
Layout: Designs either isolated in groups or pendant from rim, crossing over to opposite rim.

➡Kiatuthlanna Black-on-white

Surfaces: White to creamy white medium slip with good polish.
Temper: Fine quartz sand.
Decoration: Mineral painted designs composed of series of thin parallel lines in zigzag, stepped, or chevron patterns; some bordering solid triangles or parallelograms; triangles with ticked sides or pendant lines at one angle.
Layout: Designs divide vessel into quarters or thirds and are pendant to the painted rim.

➡Red Mesa Black-on-white

Surfaces: Slip is thin to medium, and is white or streaky white with a good polish.
Temper: Sand, sand and sherd.
Decoration: Mineral painted designs include barbed lines; parallel wide-spaced hatchure, triangles and solids with dotted borders; curved hooks and scrolls; wavy and straight oblique hatchure; usually a combination of several of these elements.
Layout: Generally banded below the rim, banded on upper jar bodies.

➡Puerco/Escavada Black-on-white

Surfaces: Rough to poorly polished with a thin or no slip.
Temper: Sand or sand and sherd.
Decoration: Mineral painted elements including broad lines, solid triangles, negative lightning, wide-spaced diagonal hatchure, checkerboards, parallel hatching; basically a Sosi style; designs often combine several elements and paint work is often sloppy.
Layout: Generally banded and often pendant from rim.

➡Reserve Black-on-white (Figure 5.2)

Surfaces: Light gray to white, medium to moderately thick slip on slightly bumpy surface, with streaky to good polish.
Temper: Crushed sherd and sand and sherd.
Decoration: Mineral painted designs composed of diagonal hatched and opposed solid elements with hatched elements usually wider than solid element; solid and hatched scrolls, solid broad lines, solid triangles and sawteeth; elements fairly large with hatching lines moderately wide-spaced.
Layout: Generally overall, spread-out designs.
Comparisons: Tularosa Black-on-white – slip is thicker, crackled, with a more lustrous

and porcelain-like finish, designs are more closely spaced with fine parallel hatching; patterns very compact, some negative designs, interlocking and opposed solids, and hatchure in rectilinear more often than curvilinear patterns.

Puerco/Escavada Black-on-white — thinner or no slip with less polish and generally poorer surface finish, no opposed solid and hatched interlocking designs, more large, heavy solid elements and painting and design work often sloppy.

➡Socorro Black-on-white (Figure 5.3)

Surfaces: Very hard, vitreous, bluish-gray paste and thin blue-gray slip which is well polished but without a lustrous finish.
Temper: Sherd and crushed dark igneous rock.
Decoration: Dense black mineral paint, sometimes subglazes, in designs which include finely drafted opposed solid and hatchure, broad line and solid figures in conjunction with hatchure in banded patterns; generally similar designs and layout to Reserve and Tularosa Black-on-white, but with distinguishing temper, paste hardness, and surface characteristics.

➡Gallup Black-on-white

Surfaces: Moderately thin to thin white slip with good to streaky polish on smooth surface.
Temper: Sherd and sand.
Decoration: Mineral painted designs are almost exclusively composed of diagonal hatchure in ladders, triangles, steps, and some interlocking patterns with few solid elements; basically a Dogoshi design system.
Layout: Open, overall patterns.

➡Tularosa Black-on-white (Figure 5.4)

Surfaces: Pearly white to light gray slip which is thick or moderately thick and often crackled; lustrous, high polish over smooth surface.
Temper: Sherd or sherd and sand, crushed rock.
Decoration: Elements are primarily interlocking opposed hatchure and solids in steps, frets, triangles, scrolls, with rectilinear patterns more common than curvilinear; longitudinal or parallel hatchure with thick framing lines, some cross hatching, dot-filled spaces; solid elements are fairly small.
Layout: Designs cover much of the vessel and are tightly spaced.

Figure 5.2: Reserve Black-on-white

Figure 5.3: Socorro Black-on-white

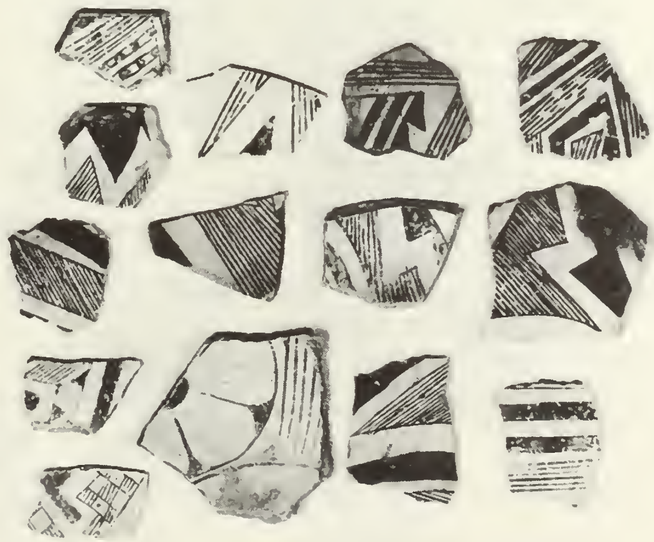


Figure 5.4: Tularosa Black-on-white

➡ Reserve/Tularosa Black-on-white (Figure 5.5)

This category is intermediate between the two types and is characterized by either a lustrous, well-polished slip with wide-spaced heavy designs, or by a streakily polished, bumpy surface with longitudinal hatchure and more compact, fine-line designs. Designs are mostly interlocking opposed solid and hatchure, or solids. Surface finish is occasionally irregular, with polish never attaining the high luster of Tularosa Black-on-white. Although most sherds classified as Reserve/Tularosa Black-on-white do not necessarily exhibit all the characteristics of Reserve or Tularosa Black-on-white, they can be placed in either of the two types. Recognizing that a continuum of attributes exists between Reserve and Tularosa types, use of a Reserve/Tularosa category attempts to overcome classification difficulties.

➡ Klageto Black-on-white (Figure 5.6)

Surfaces and Temper: Similar or identical to Tularosa Black-on-white.
Decoration: Dense black mineral paint; designs are small and intricate, producing a negative effect; elements include solid opposed stepped triangles, stepped parallel lines, frets, fine parallel hatchure and diagonal hatching and opposed solids and hatchure are rare.
Layout: Very closely spaced, overall designs.

Note: Klageto Black-on-white was first named and described by Colton and Hargrave (1937) based on a small sample from Le Roux Wash, Kintiel Pueblo, in northeastern Arizona. Of the five sherds illustrated (Colton and Hargrave 1937:Figure 61), three appear to be classic Tularosa Black-on-white, and the authors admit their sample is small and localized. Both Danson and McGimsey include sherds with Klageto style design elements, but they are lumped into Tularosa Black-on-white. It is notable that the Klageto style sherds McGimsey recovered from Site 616 are associated with the latest tree-ring sample dates from that pueblo.

According to Smith (1971:267-268), Danson later refers to the Klageto style sherds as a "late version of Tularosa Black-on-White." Although the sample from Awatovi was small, Smith provides a thorough discussion of Klageto Black-on-white along with illustrations. The Klageto Black-on-white sherds recorded during this project are very similar to those recovered and described by Smith.

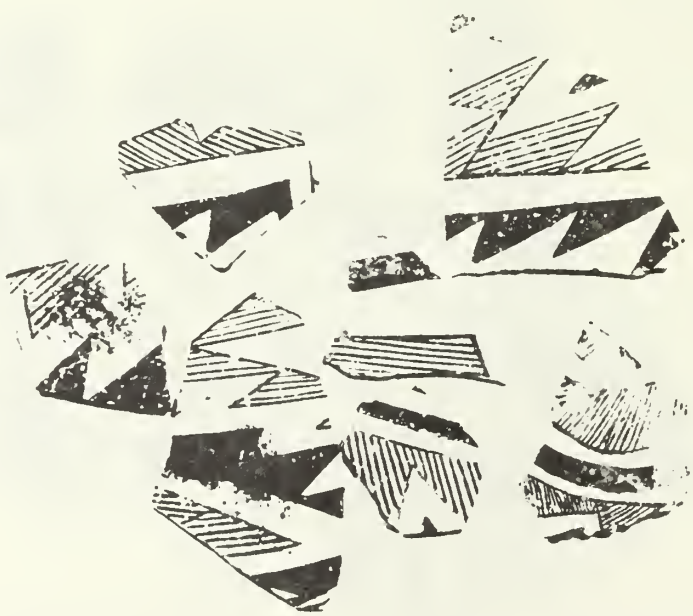


Figure 5.5: Reserve/Tularosa Black-on-white

Figure 5.6: Klageto Black-on-white

Mogollon decorated wares

➡Mogollon Red-on-brown

Surface: Unslipped, dimpled, polished surfaces ranging from light to dark tan.
Temper: Multilithic sand.
Decoration: Light red to red-brown paint (pigment possibly a clay) with solid triangles outlined or framed with sets of parallel lines, series of nested chevrons, and pendant triangles.
Layout: Overall patterns which usually quarter the vessel.

➡Three Circle Red-on-white

Surface: Fairly thick chalky white slip and streaky polish over an oxidized paste.
Temper: Multilithic sand.
Decoration: Red mineral paint with designs similar to Mogollon Red-on-brown with addition of bold, open spirals and scrolls; considerable variability in design, similar to Red Mesa Black-on-white.
Layout: Isolated elements in overall patterns and elements which quarter the vessel.

➡San Francisco Red

Surface: Slipped with dark blood-red to red-brown or reddish tan clay over a bumpy or dented surface; polish has a lustrous sheen.
Temper: Multilithic sand.

➡Boldface, Transitional, and Mimbres Black-on-white

Surface: Moderately thick creamy to chalky white polished slip with a tendency to spall; smoothed, oxidized brownware paste.
Temper: Multilithic sand.
Decoration: Boldface B/W – scrolls, bold thick wavy lines, some anthropomorphs; designs are pendant from rim with no banding lines between rim and design, overall system which divides vessel into quarters or thirds. Transitional B/W – broad framing lines enclosing hatching, cross-hatching, zigzag lines, and chevrons; designs pendant from rim without banding lines around rim. Classic – thin framing lines enclosing thin hatchure, opposed solids and hatchure, solid stepped and triangle elements; distinctive banded designs just below rim, with central figure such as zooamorphs or anthropomorphs.

White Mountain Redwares

➡Puerco Black-on-red

Surfaces: Slip is a deep maroon red with a good to moderately good polish.
Decoration: Sharp black mineral painted designs are almost exclusively solids such as

triangles, broad lines, checkerboards, and parallel hatching.
Layout: Generally banded designs.

➡Wingate-Black-on-red

Surfaces: Slip is a maroon red with good polish on well smoothed surface.
Decoration: Sharp black mineral painted designs are almost exclusively opposed solid and diagonal hatchure elements.
Layout: Banded or overall systems.

➡Wingate Polychrome (Figure 5.7a and 5.7b)

Surfaces: Slip color, polish and surface finish identical to Wingate Black-on-red.
Decoration: Bowl interiors usually with Wingate Black-on-red designs, but can have Puerco Black-on-red solid designs; bowl exteriors decorated with designs in red slip paint on white or yellow-buff paste, or red slip paint designs applied over a white slipped exterior. These slip paint designs are usually simple banding, large frets, scrolls, terraces, hands, or birds. Occasionally, exterior is corrugated with red slip spread over ribs.

➡St. Johns Black-on-red and St. Johns Polychrome

Surfaces: Slip is bright red to red-orange, well polished, over very smooth surface.
Decoration: Black, brownish-black, or brownish-orange mineral/carbon paint which is absorbed by the slip in blotter-like fashion; designs include Tularosa style interlocking opposed solids and hatchure. St. Johns Polychrome has exterior designs in white kaolin which include large, broad line bands of frets, keys, scrolls, or hands, birds, and other single elements. Occasionally the white kaolin is used to outline the interior, black designs.
Layout: Broad banded or overall patterns on interior, exterior designs are broad bands.

➡Springerville Polychrome

Surfaces: Bright orange slip over well-smoothed surfaces with a high polish.

Decoration: Paint is a carbon to carbon-mineral mix which is absorbed by the slip; designs are similar to St. Johns Black-on-red and Polychrome; exterior designs are finer than St. Johns Polychrome and can have addition of black bands or outlines. The white kaolin is thicker and creamier, and black designs are applied over this.
Layout: Interior can be banded or overall and exterior is banded.

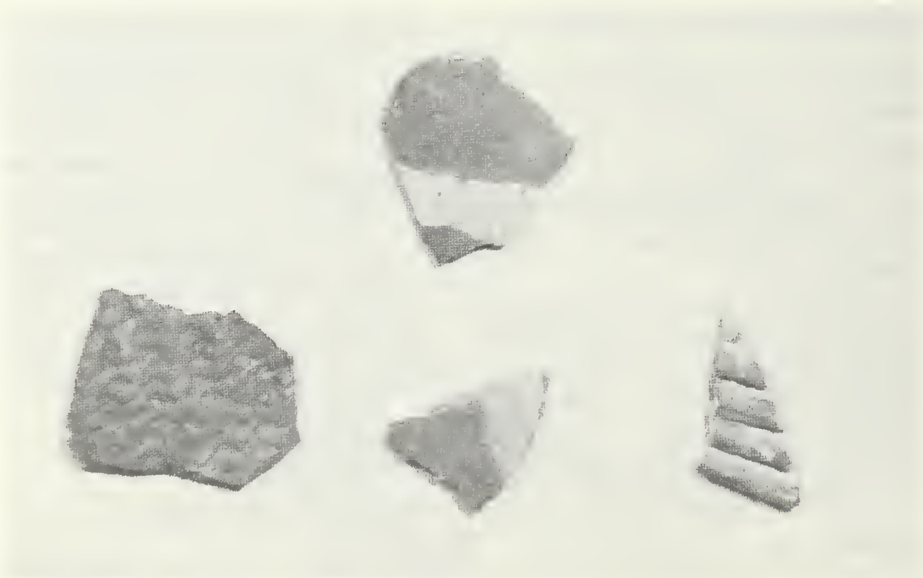


Figure 5.7a: Wingate Polychrome exteriors

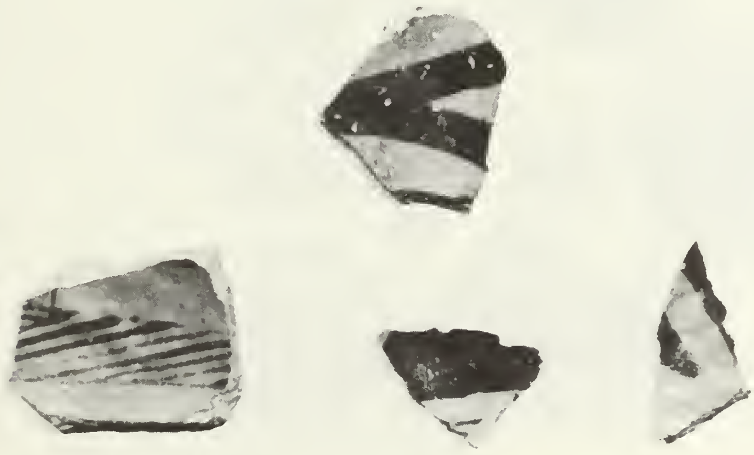


Figure 5.7b: Wingate Polychrome interiors

Utility Wares

➡Brownwares (Figure 5.8)

The oxidized brownwares have sand temper, fine pastes, and are separated by various surface textures, which include (1) Plain Brown – unpolished or poorly polished; (2) Plain Polished – well polished surface(s); (3) Neckbanded – slightly flattened plain coils without an overlapping or clapboard appearance; (4) Plain Corrugated – generally very narrow plain unobliterated, unindented coils; (5) Indented Corrugated; (6) Patterned Corrugated – alternate plain and indented corrugations in banded, diamond, triangular, or chevron patterns; and (7) Tooled Corrugated – a stick or other tool used to scribe patterns into or over corrugations, in sets of parallel lines, diagonal lines, diamonds, etc.

➡Graywares

Graywares are sand or sand and sherd tempered, generally coarse pastes, and separated by various surface textures, which include (1) Lino or Plain Gray – rounded quartz sand-tempered plainware which is smoothed and has temper inclusions protruding through surfaces; (2) Kana'a Neckbanded – flattened plain coils without clapboard or overlapping effect; (3) Plain Gray Body – sherds without distinctive temper and surfaces of Lino, lower body sherds from partially indented corrugated vessels; (4) Plain Corrugated – unindented, unflattened coils, without obvious overlapping effect, often part of patterned corrugated vessel; (5) Clapboard – plain unindented coils with pronounced overlapping effect; (6) Indented Corrugated; and (7) Obliterated Corrugated – coils are rubbed, smeared or otherwise partially obliterated.

➡Gray/Brown Indented Corrugated

This type was noted by Crown (1980) in the St. Johns area, and has characteristics of both gray and brown utility wares. The Gray/Brown Indented Corrugated has coil width and diagonal indentions typical of Cibola Indented Corrugated wares, but surface colors range from medium gray to a dirty gray-brown; temper is a fine gritty sand, with a fine dark brown paste typical of Mogollon brownwares.

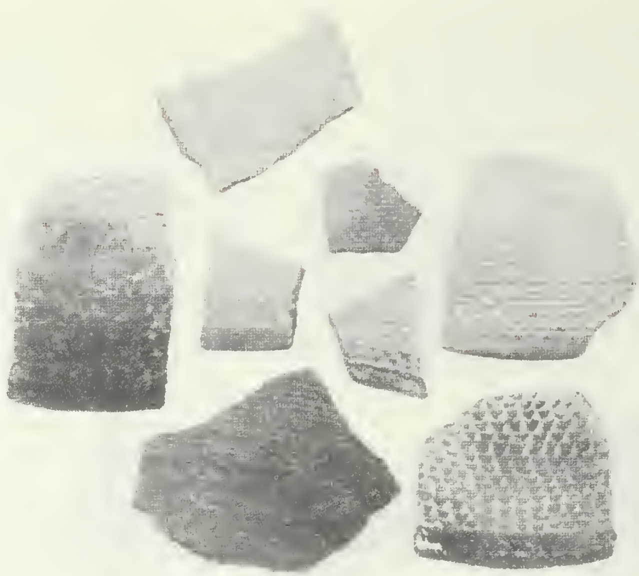


Figure 5.8: Mogollon brownwares

➡ Cheap Johns Black-on-white Variety (Figure 5.9)

This pottery was recorded at Cheap Johns Village, just southwest of the Zuni Salt Lake. It appears to have characteristics of both Anasazi and Mogollon wares, and is stylistically and technologically a Pueblo I pottery. It should be considered a variety of both Kiatuthlanna Black-on-white and Mogollon Red-on-brown, and given a type status until more work has been done in the region and the characteristics of this pottery are more fully understood.

Paste: Medium to hard, gray to buff; vessel walls thin (2-4 mm).
Temper: Sand, predominately multilithic sand (quartz, feldspar, olivine, etc.) or pure quartz sand; somewhat angular; moderate to profuse quantities.
Surface: Bowl exterior has lumpy surface which has been smoothed (similar to San Francisco Red surface) and is slipped with thin white to buff slip; polished to matte finish with temper particles showing through but not protruding from the surface. Bowl interiors are very well smoothed without lumps and are slipped with medium thick white to buff slip; streaky to lustrous polish; temper does not show through.
Paint: Mineral in carbon base; most often red, red-brown, brown, rarely black; generally good permanency and moderately thick, but brush strokes often visible.
Decoration: Almost exclusively parallel lines 2-3 mm thick with roughly equal spacing between lines, pendant triangles on one of parallel lines, or nested chevrons with solid triangles.
Layout: Designs diagonally pendant from rim in overall patterns.
Rims: Primarily direct, pinched rim with solid painted line; some flattened rims; some have designs which come up to rim creating ticked effect.
Vessel Shapes: Simple bowl forms, compound (lobed) bowl form rare.

Vessel Form

Vessel form categories recorded include a bowl, jar, ladle, and indeterminate. Pitchers were not distinguished from jars nor were "seed jar" and necked jar forms separated. Smudged brownware sherds belonging only to a category of bowls with polished, intentionally smudged interiors were recorded in a

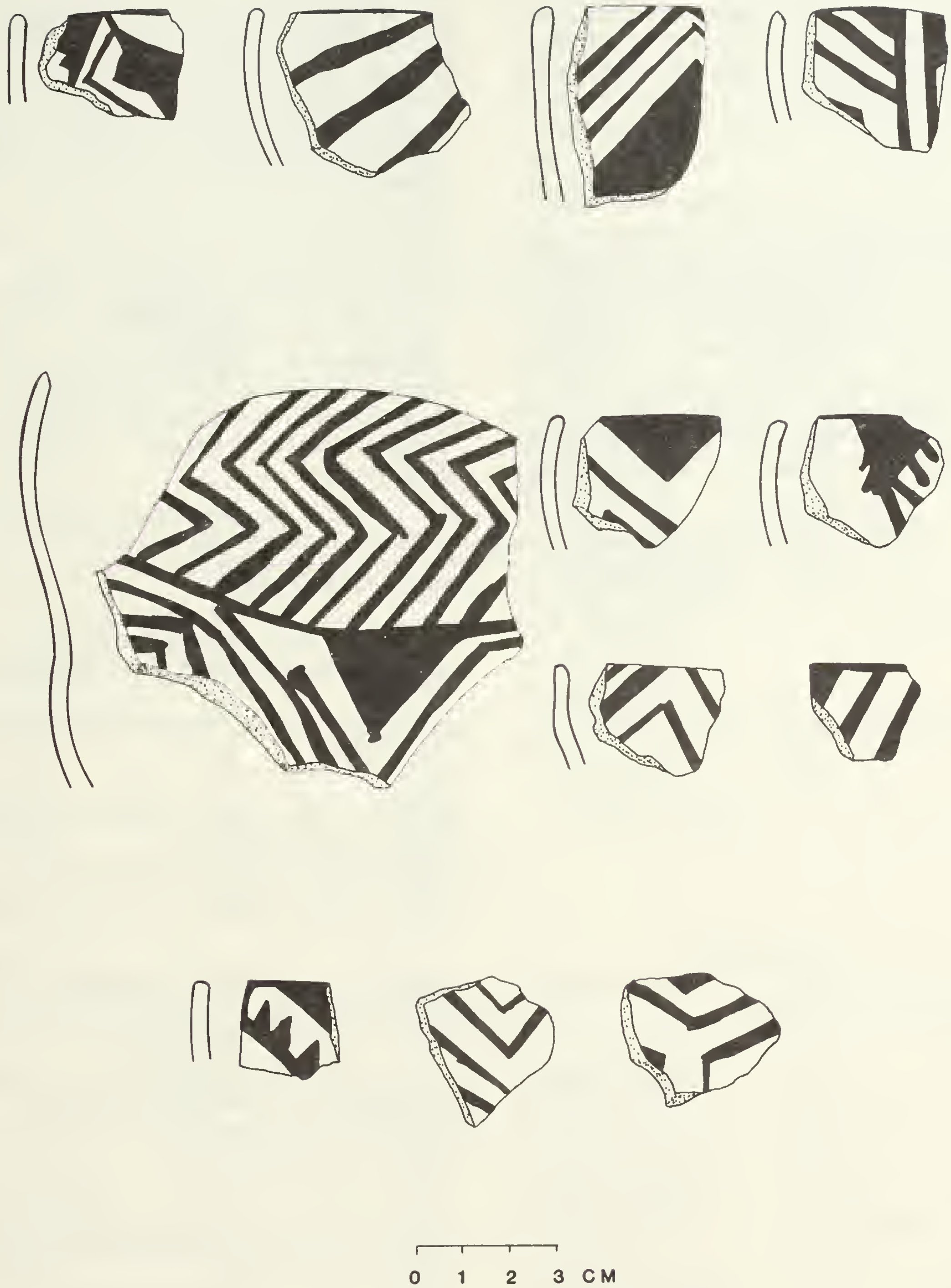


Figure 5.9: Cheap Johns Black-on-white

separate category from unsmudged bowl sherds. Bowl sherds were distinguished from jar sherds based on interior polishing, characteristic rim form (not an everted or inverted rim), and sherd curvature.

Dating Range

The presence or absence rather than relative frequencies of pottery types determines the temporal classification of ceramic samples (Table 5.2). General time periods thought to be represented by ceramics at sites were noted in the field, and this assignment was later assessed with a review of inventoried pottery types in each sample once these data had been processed. Assignment of ceramic samples to specific, narrow time spans based on relative frequencies of sherds in diagnostic pottery-type categories can be a misleading dating method. For example, samples consist of surface materials subject to a number of post-depositional processes including collection by archeologists and are, therefore, potentially not representative of the entire range of ceramic types originally present at a location. Furthermore, many types are either poorly dated or existing dates apply to collections from outside the Quemado region; Yellowhouse Ceramic complexes (Hunter-Anderson 1978), for example, tailored to fit ceramic associations in the Yellowhouse-Zuni Uplift region can span as few as 25 to 50 years. Applicability of these complexes to ceramic assemblages in the Quemado area has yet to be demonstrated.

Table 5.2. Temporal Categories and Ceramic Associations for the SACA.

Period	Dating Range	Ceramic Association
Basketmaker III	A.D. 500-700	plain gray (Lino), plain brown (Alma) Lino B/G, Mogollon R/B, San Franciscan Red
Basketmaker III-Pueblo I	A.D. 500-800	same as above plus Kana'a/Whitemound/ La Plata B/W
Pueblo I	A.D. 700-900	plain gray, plain brown, neckbanded and clapboard brown and gray, Kana'a/Whitemound/La Plata B/W, Kiatuthlanna Mogollon R/B, Three Circle R/W
Pueblo I-Pueblo II	A.D. 800-1000	same as above plus Red Mesa B/W, no White Mountain Redwares, few indented corrugated
Pueblo II	A.D. 900-1100	indented corrugated, patterned corrugated gray and brown wares, Reserve B/W, Puerco B/R, Wingate B/R, Puerco B/W, Socorro B/W, Gallup B/W
Pueblo II - Pueblo III	A.D. 1050-1150	same as above plus Reserve/Tularosa B/W, Wingate Polychrome, no other polychromes
Pueblo III -	A.D. 1100-1250	Tularosa B/W, Reserve/Tularosa B/W, St. Johns B/R, St. Johns Polychrome, indented corrugated gray and brown wares, fillet rim smudged brownware
Late Pueblo III	A.D. 1250-1300	same as above plus Tularosa/Klageto B/W, Springerville Polychrome

Ceramic Data From Quadrat and Reconnaissance Surveys

Quadrat and reconnaissance surveys collected ceramic data from 175 site locations and 71 isolated finds in the Moderate Production Area. Ceramic ware, type, and vessel form were recorded for 18,242 sherds. Type frequencies encountered by the quadrat survey (Table 5.3) contrast somewhat with those obtained by both quadrat and reconnaissance surveys (Table 5.4). These differences and the sampling methods employed to record ceramic data at locations in the SACA are described below.

Table 5.3: Ceramic Wares and Types Recorded in the Project Area

Whitewares

Ceramic Type	Total Sherds	% of Overall
Reserve B/W	1460	8.11
Tularosa B/W	1014	5.63
Res-Tula B/W	465	2.58
Unk Whiteware Body	2054	11.41
Unk Solid B/W	475	2.64
Unk Hatch B/W	125	0.69
Lino B/G	11	0.06
LaPlt/Kanaa/WM B/W	27	0.15
Kiatuthlana B/W	14	0.08
Red Mesa B/W	648	3.60
Escavada B/W	11	0.06
Puerco B/W	41	0.23
Gallup B/W	43	0.24
Socorro B/W	14	0.08
Mimbres B/W	4	0.02
Three Circle	9	0.05
Cheap Johns	31	0.17
Klagetoh	46	0.26
Total Whitewares	**6492**	**36.07**

Graywares

Ceramic Type	Total Sherds	% of Overall
Lino Plain	550	3.06
Kana'a Banded	334	1.86
Plain Gray Body	1957	10.87
Plain Corrug	178	0.99
Clapboard	392	2.18
Indent Corr (Gry)	2997	16.65
Oblit Corrug	31	0.17
Unk Grayware	20	0.11
Neck Corrugated	33	0.18
Lino Red Wash	1	0.01
Total Graywares	**6493**	**36.08**

Redwares

Ceramic Type	Total Sherds	% of Overall
Puerco B/R	66	0.37
Wingate B/R	281	1.56
Wingate Poly	20	0.11
St. Johns B/R	473	2.63
St. Johns Poly	298	1.66
Springerville Poly	42	0.23
Unk WM Redware	472	2.62
Unk Redware	11	0.06
Local Redware	5	0.03
San Fran Red	3	0.02
Total Redwares	**1671**	**9.29**

Brownwares

Ceramic Type	Total Sherds	% of Overall
Plain Brown	322	1.79
Polished Brown	745	4.14
Neckbanded	62	0.34
Indent Corr (Brn)	1435	7.97
Pattern Corrug	85	0.47
Tooled Corrug	34	0.19
Fillet Rim	28	0.16
Unk Brownware	14	0.08
Brn/Gry Corrug	69	0.38
Plain Corrug	538	2.99
Mogollon R/B	7	0.04
Total Brownwares	**3339**	**18.55**

Table 5.4: Ceramic Wares and Types Recorded in the Quadrat Sample

Whitewares

Ceramic Type	Total Sherds	% of Overall
Reserve B/W	1159	11.87
Tularosa B/W	157	1.61
Res-Tula B/W	117	1.20
Unk Whiteware Body	1283	13.14
Unk Solid B/W	249	2.55
Unk Hatch B/W	67	0.69
Lino B/G	1	0.01
LaPlt/Kanaa/WM B/W	25	0.26
Kiatuthlana B/W	14	0.14
Red Mesa B/W	634	6.49
Escavada B/W	9	0.09
Puerco B/W	33	0.34
Gallup B/W	37	0.38
Socorro B/W	4	0.04
Mimbres B/W	3	0.03
Total Whitewares	**3792**	**38.83**

Redwares

Ceramic Type	Total Sherds	% of Overall
Puerco B/R	47	0.48
Wingate B/R	68	0.70
Wingate Poly	3	0.03
St. Johns B/R	47	0.48
St. Johns Poly	50	0.51
Springerville Poly	2	0.02
Unk WM Redware	109	1.12
Unk Redware	4	0.04
Local Redware	1	0.01
San Fran Red	1	0.01
Total Redwares	**332**	**3.40**

Graywares

Ceramic Type	Total Sherds	% of Overall
Lino Plain	418	4.28
Kana'a Banded	312	3.20
Plain Gray Body	1575	16.13
Plain Corrug	109	1.12
Clapboard	332	3.40
Indent Corr (Gry)	1140	11.67
Oblit Corrug	13	0.13
Unk Grayware	9	0.09
Neck Corrugated	29	0.30
Total Graywares	**3937**	**40.32**

Brownwares

Ceramic Type	Total Sherds	% of Overall
Plain Brown	225	2.30
Polished Brown	503	5.15
Neckbanded	60	0.61
Indent Corr (Brn)	460	4.71
Pattern Corrug	30	0.31
Tooled Corrug	28	0.29
Fillet Rim	6	0.06
Unk Brownware	11	0.11
Brn/Gry Corrug	12	0.12
Plain Corrug	365	3.74
Mogollon R/B	3	0.03
Total Brownwares	**1703**	**17.44**

Among the whitewares recorded by both surveys, Reserve Black-on-white is the most frequently occurring type, comprising 22.5 percent of the whitewares. Tularosa Black-on-white follows making up 15.6 percent of the whitewares. Red Mesa Black-on-white is the next most abundant type, followed by Reserve/Tularosa Black-on-white.

The remainder of the identifiable types comprise less than one percent of the sherds in the overall ceramic sample and in the whiteware category. Redwares are dominated by St. Johns Black-on-red, St. Johns Polychrome and Wingate Black-on-red. The remainder of the identifiable redwares contribute less than one percent of the total number of sherds analyzed to the quadrat and reconnaissance sample. Sampled ceramics include twice as many graywares as brownwares, with Indented Corrugated being the most abundant type of both wares. Utility wares include relatively high counts of Plain Gray and Plain Brown types and a variety of sherds with other utility ware surface treatments.

Ceramic ware and type counts recorded during the quadrat survey (Table 5.4) can be compared with those documented by the ceramic sample from both surveys (Table 5.3). The greater variety of ceramic types in the combined sample is due to reconnaissance of locations occupied during a longer time span and to concentration by reconnaissance survey on architectural units occupied after A.D. 900. Three Circle Red-on-white, Klageto Black-on-white, and Cheap Johns Black-on-white are present in the combined sample, but were not recorded in quadrat assemblages. Whitewares comprise a roughly equal percentage of the sampled ceramics from quadrats and from quadrat and reconnaissance survey samples combined.

Reserve Black-on-white is the most abundant decorated whiteware type in both the quadrat assemblages and the combined sample; Tularosa Black-on-white and Reserve/Tularosa Black-on-white are present in quadrat assemblages, but in considerably smaller quantities than in the combined sample. Redwares in quadrat assemblages are also recorded in smaller amounts than in the combined sample. These differences are not surprising since Tularosa, Reserve/Tularosa, and redware types occur more frequently at later period sites, the ones yielding the highest sherd frequencies in the reconnaissance sample.

Comparison between the combined sample (Table 5.5) and the quadrat sample (Table 5.6) indicate very similar bowl and jar sherd proportions for most of the whiteware pottery types. This is true as well for the redware, grayware, and brownware types.

In the combined sample, however, the ratio of whiteware jar sherds to bowl sherds is higher than in the quadrat sample, a difference probably due to the inclusion in the reconnaissance sample of large architectural sites with middens yielding high jar counts.

Table 5.5: Bowl and Jar Frequencies Recorded in the Project Area

WHITEWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Reserve B/W	367	1053	0.258	0.742	1460
Tularosa B/W	93	856	0.098	0.902	1014
Res-Tula B/W	85	365	0.189	0.811	465
Unk Whiteware Body	284	1649	0.147	0.853	2054
Unk Solid B/W	122	342	0.263	0.737	475
Unk Hatch B/W	24	100	0.194	0.806	125
Lino B/G	11	0	1.000	0.000	11
LaPlt/Kanaa/WM B/W	18	6	0.750	0.250	27
Kiatuthlana B/W	9	5	0.643	0.357	14
Red Mesa B/W	255	374	0.405	0.595	648
Escavada B/W	4	7	0.364	0.636	11
Puerco B/W	11	29	0.275	0.725	41
Gallup B/W	17	25	0.405	0.595	43
Socorro B/W	5	9	0.357	0.643	14
Mimbres B/W	3	1	0.750	0.250	4
Three Circle	9	0	1.000	0.000	31
Cheap Johns	31	0	1.000	0.000	31
Klagetoh	5	40	0.111	0.889	46
TOTAL WHITEWARES	**1353**	**4861**			**6492**

Table 5.5: Bowl and Jar Frequencies Recorded in the Project Area (Continued)

GRAYWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Lino Plain	1	399	0.002	0.997	550
Kana'a Banded	0	334	0.000	1.000	334
Plain Gray Body	5	1950	0.003	0.997	1957
Plain Corrug	0	178	0.000	1.000	178
Clapboard	0	392	0.000	1.000	392
Indent Corr (Gry)	17	2980	0.006	0.994	2997
Oblit Corrug	0	31	0.000	1.000	31
Unk Grayware	0	20	0.000	2.000	20
Neck Corrugated	1	32	0.030	0.920	33
Lino Red Wash	0	1	0.000	1.000	1
TOTAL GRAYWARES	**24**	**6317**			**6493**

REDWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Puerco B/R	59	7	0.894	0.106	66
Wingate B/R	254	24	0.914	0.086	281
Wingate Poly	20	0	1.000	0.000	20
St. Johns B/R	388	82	0.826	0.174	473
St. Johns Poly	298	0	1.000	0.000	298
Springerville Poly	42	0	1.000	0.000	42
Unk WM Redware	384	76	0.835	0.165	472
Unk Redware	11	0	1.000	0.000	11
Local Redware	4	1	0.800	0.200	5
San Fran Red	3	0	1.000	0.000	3
TOTAL REDWARES	**1461**	**190**			**1671**

BROWNWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Plain Brown	62	195	0.241	0.759	322
Polished Brown	276	348	0.442	0.558	745
Neckbanded	1	61	0.016	0.984	62
Indent Corr (Brn)	383	1036	0.270	0.730	1435
Pattern Corrug	32	52	0.381	0.619	85
Tooled Corrug	7	27	0.206	0.794	34
Fillet Rim	22	6	0.786	0.214	28
Unk Brownware	3	10	0.231	0.769	14
Brn/Gry Corrug	3	66	0.043	0.957	69
Mogollon R/B	5	2	0.714	0.286	7
TOTAL BROWNWARES	**940**	**2170**			**3339**

Table 5.6: Bowl and Jar Frequencies Recorded in the Quadrat Sample

WHITEWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Reserve B/W	293	841	0.258	0.742	1159
Tularosa B/W	17	131	0.115	0.885	157
Res-Tula B/W	17	99	0.147	0.853	1283
Unk Whiteware Body	223	983	0.185	0.815	1283
Unk Solid B/W	67	178	0.273	0.727	249
Unk Hatch B/W	12	55	0.179	0.821	67
Lino B/G	1	0	1.000	0.000	1
LaPlt/Kanaa/WM B/W	16	6	0.727	0.273	25
Kiatuthlana B/W	9	5	0.643	0.357	14
Red Mesa B/W	246	370	0.399	0.601	634
Escavada B/W	4	5	0.444	0.556	9
Puerco B/W	9	23	0.281	0.719	33
Gallup B/W	15	21	0.417	0.583	37
Socorro B/W	1	3	0.250	0.750	4
Mimbres B/W	3	0	1.000	0.000	3
TOTAL WHITEWARES	**933**	**2720**			**3792**

GRAYWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Lino Plain	1	394	0.003	0.997	418
Kana'a Banded	0	312	0.000	1.000	312
Plain Gray Body	4	1570	0.003	0.997	1575
Plain Corrug	0	109	0.000	1.000	109
Clapboard	0	332	0.000	1.000	332
Indent Corr (Gry)	17	1123	0.015	0.985	1140
Oblit Corrug	0	13	0.000	1.000	13
Unk Grayware	0	9	0.000	1.000	9
Neck Corrugated	1	28	0.034	0.966	29
TOTAL GRAYWARES	**23**	**3890**			**3937**

REDWARES

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
Puerco B/R	42	5	0.894	0.106	47
Wingate B/R	59	9	0.868	0.132	68
Wingate Poly	3	0	1.000	0.000	3
St. Johns B/R	37	10	0.787	0.213	47
St. Johns Poly	50	0	1.000	0.000	50
Springerville Poly	2	0	1.000	0.000	2
Unk WM Redware	93	14	0.869	0.131	109
Unk Redware	4	0	1.000	0.000	4
Local Redware	1	0	1.000	0.000	1
San Fran Red	1	0	1.000	0.000	1
TOTAL REDWARES	**292**	**38**			**332**

Table 5.6: Bowl and Jar Frequencies Recorded in the Quadrat Sample (Continued)

Ceramic Type	Bowl Total	Jar Total	Bowl Propor.	Jar Propor.	Sample Total
	BROWNWARES				
Plain Brown	53	156	0.254	0.746	225
Polished Brown	179	290	0.382	0.618	503
Neckbanded	0	60	0.000	1.000	60
Indent Corr (Brn)	157	295	0.347	0.653	460
Pattern Corrug	15	14	0.517	0.483	30
Tooled Corrug	3	25	0.107	0.893	28
Fillet Rim	5	1	0.833	0.167	6
Unk Brownware	3	7	0.300	0.700	11
Brn/Gry Corrug	0	12	0.000	1.000	12
Mogollon R/B	1	2	0.333	0.667	3
TOTAL BROWNWARES	**519**	**1104**			**1703**

Ceramic samples, taken from provenience classes defined on the basis of associated structures and features, are listed in Table 5.7. Artifact scatters comprise the largest provenience class. Grid and all-observed samples were recovered from 107 artifact scatters. All observed sherds were recorded at most of these scatters. Sampling units at the recorded 26 middens include grids varying in size from 2x2 m to 5x5 m. Room contents, scatters on roomblocks and at pit structures, and other features were recorded with all-observed samples where logistically feasible. The large number and high density of sherds at some locations precluded the recording of all observed ceramics at these places. In these cases, grids intended to recover a minimum sherd count of 50 items were used.

The placement of grids on general surface and midden scatters was accomplished on a subjective basis, every attempt being made to encompass the full range of type variability at a location. As a result, ceramics in high frequency, high variety grid samples represent relatively small areas. The history of artifact accumulation in these areas should differ in many respects from that of low density scatters and should be reflected in the composition of samples.

Table 5.7: Ceramic Samples by Feature and Sample Type

FEATURES	GRID AND OTHER SAMPLES No. Samples	GRID AND OTHER SAMPLES No. Sherds	ALL-OBSERVED SAMPLES No. Samples	ALL-OBSERVED SAMPLES No. Sherds
Ceramic Scatter	---	---	3	40
Lithic/Ceramic Scatter	5	530	29	616
Scatters with Features	6	593	28	757
Scatters with Structures	14	1,389	22	1,797
Pit Structures	4	795	3	339
Roomblocks	3	1,477	23	2,947
Rooms	---	---	5	1,074
Middens	25	4,779	1	188
Dance Plaza	1	76	2	335
Earthworks	1	264	---	---

Ceramic Samples by Period of Occupation

In this section, ceramic samples from sites or proveniences which have been classified into periods of occupation are discussed. The frequency and percentage of pottery types in samples from sites are presented along with an analysis of decorated utility, white/red, and gray/brown ware proportions and of bowl/jar sherd proportions in samples representing different periods. The relative percentages of pottery types are generally distinctive with respect to period since these types were initially used as the definitional criteria for grouping sites and their samples into periods. Variation in the proportions of different wares and of bowl and jar sherds among the time periods is due, in part, to differences in the sizes of sample areas and to functional differences among sampled locations as indicated by the features and structures associated with surface ceramic and ceramic/lithic scatters.

The nine periods to which ceramic samples were classified were given a Pecos classification designation. The periods ranging from A.D. 500 to 1300 are listed in Table 5.8, along with the kinds of structures and features associated with sampled areas at sites. Undated samples and isolated occurrences make up two additional categories in this analysis. Definition of the ceramic assemblages indicative of certain periods is based on dated ceramic collections from the Quemado area and from elsewhere in the region. Often, architectural styles, the presence of certain features (e.g. large open plazas), and the placement of features relative to others at sites were considered in conjunction with the pottery types present in order to classify a ceramic sample.

Patterns in Sample Content

The most obvious trends noted for pottery types in samples are those indicated by the relative percentages of types such as Red Mesa Black-on-white, Reserve Black-on-white, Tularosa Black-on-white, and Klageto Black-on-white, used to classify samples initially. The ceramic samples at locations identified as Pueblo I occupations are dominated by Red Mesa Black-on-white and Plain Gray and Clapboard Gray utility ware types. From late Pueblo I times and throughout the Pueblo II period, Reserve Black-on-white is the main type of decorated ware at sites. White Mountain Redware bichromes and Indented Corrugated Graywares occur at locations during this time. The Pueblo II period is marked by an increase in White Mountain Redwares. Polychrome and Tularosa Black-on-white ceramics are more abundant in Pueblo III period samples as are Klageto Black-on-white sherds in late Pueblo III period samples.

Several patterns and trends have been identified using proportions of different wares and vessel forms in samples. Decorated wares are most abundant in Pueblo I-II samples, while Pueblo II ceramics are dominated by utility wares. In contrast to earlier samples, Pueblo II-III and late Pueblo III assemblages have slightly higher proportions of decorated wares. Graywares comprise the majority of sherds in Pueblo I-II utility ware assemblages, while in Pueblo II-III through Pueblo III samples the proportions of graywares and brownwares vary. Redwares are absent in most of the Pueblo I-II samples and occur at low frequencies in Pueblo III and late Pueblo III samples. In addition, redwares comprise an average of over 25 percent of the ceramics in several of the later Pueblo II samples. Bowl sherds do not comprise a majority in samples from any period, but do tend to increase in relative frequency in samples through time.

These general trends are apparent when variation in the kinds of structures and features present at sites or proveniences is held constant. A review of Table 5.8 will indicate that earlier samples were recorded at scatters which represent the greatest variety of associated structures and features. Later samples are primarily from scatters associated with features and structures at large, architecturally complex sites; thus, the trends noted from analysis of these later samples may reflect the functional and other characteristics of assemblages associated with such features.

Basketmaker III Samples

Basketmaker III components have only been identified at locations yielding evidence of multiple occupations. In the project area, the

Cerro Colorado site (Bullard 1962:10-11; Danson 1957:68-69) and a site recorded by Moore and others (1983) contain Basketmaker III components. Excavations at Cerro Colorado revealed a Basketmaker III ceramic complex associated with most of the structures on the site (Bullard 1962:10); the complex consists primarily of plain graywares and a small proportion of plain brownwares. La Plata Black-on-white is the only decorated type associated with this complex. Although the physiographic setting of the few Basketmaker III sites in the region is an upland one, i.e. on high ridge tops or mesas, these sites may also be covered by the structures and materials of later occupations. In addition, it is likely that alluviation may obscure the Basketmaker III structures and other remains in some lowland settings. Also, the ceramic assemblage denoting these occupations is composed primarily of plain brown and graywares and is not easily distinguishable from assemblages of later components.

Basketmaker III-Pueblo I Samples

Two proveniences were recorded as containing Basketmaker III and Pueblo I components. Whether these sites are the result of multiple occupations during two distinct temporal periods or represent occupations during the late Basketmaker III and early Pueblo I times is not known. Cheap Johns Village, Site 429, is an extensive refuse scatter associated with possible surface and/or subsurface structures. Like Cheap Johns Village, structural features are in evidence on Site 316, a smaller scatter, but are difficult to define from surface indications. The ceramic samples from Site 316 and Cheap Johns Village are listed in Table 5.9, and the relative proportions of different wares and bowl and jar sherds are in Table 5.10. The assemblages are different in type content and in relative proportions of gray and brown wares. The Cheap Johns Village sample contains a variety of Mogollon decorated wares, including Mogollon Red-on-brown, Three Circle Red-on-white, Cheap Johns Black-on-white (thought to be a Mogollon/Anasazi ware), and San Francisco Red. Also recorded in this sample are Anasazi wares, including La Plata/Kana'a/White Mound Black-on-white, Red Mesa Black-on-white, and Lino Red Wash types. The Reserve Black-on-white sherd may result from the

Table 5.8: Periods and General Provenience of Ceramic Samples

Site/Provenience Class	BMIII-PI	BMIII-PII	PI	PI-PII	PII	PII-PIII	PIII	Late PIII	PI-PIII	Undated	Total
Refuse Scatters											
Ceramics Only					2					1	3
Lithic/Ceramic		2		8	9	7	1		1	6	34
L/C w/Features			1	11	6	5			1	10	34
L/C w/Structure				12	17	6				1	36
Pithouse/Scatter	2			5							7
Roomblock				2	7	6	6	5			26
Room				1	2			2			5
Midden				8	7	8	2	1			26
Dance Plaza					1		2				3
Earthworks					1						1
TOTAL	**2**	**2**	**1**	**47**	**52**	**32**	**11**	**8**	**2**	**18**	**175**

Pueblo II component located upslope from this sampled area. The pottery on Site 316 is less varied, and only Mogollon Red-on-brown and Red Mesa Black-on-white decorated types are present. The utility wares, however, include both brown and gray neckbanded wares, which were not recorded in the Cheap Johns assemblage. The decorated/utility ware proportions are similar, averaging 26.5 percent for decorated wares and 77.5 percent for utility wares. The gray/brown ware proportions differ between these sites, with a high percentage of brownwares at Site 316, and nearly equal percentages of the two wares at Cheap Johns Village. Redwares are absent at Site 316 and make up a very small percent at Site 429. The bowl/jar proportions calculated for all wares at Cheap Johns Village are questionable since most of the utility wares at this site were too eroded to determine vessel form. Decorated bowl/jar proportions are comparable, however, and demonstrate differences between the two sites.

Table 5.9: Basketmaker III-Pueblo I Ceramic Assemblages

	Site 316		Site 429 Cheap Johns	
Pottery Types	No.	Percent	No.	Percent
La Plata/Kana'a/Whitemound B/W			10	3.1
Mogollon R/B	2	2.0	4	1.2
Three Circle B/W			8	2.5
Cheap Johns B/W			31	9.6
Red Mesa B/W	18	18.4		
Reserve B/W			1	0.3
Unidentified Solid B/W			8	2.5
Whiteware Body Sherd	10	10.2	8	2.5
San Francisco Red			2	0.6
Lino Red Wash			1	0.3
Plain Brown	21	21.4	42	13.0
Plain Polished	30	30.6	82	25.3
Neckbanded Brown	4	4.1		
Unident. Brown	2	2.0		
Lino Plain	8	8.2	127	39.2
Kana'a Neckbanded	3	3.1		
TOTAL SAMPLE	**98**		**324**	

Table 5.10: Basketmaker III-Pueblo I Ceramic Ware and Bowl/Jar Proportions

	Site No. 316	Site No. 429
Provenience	1-pithouse?, trash scatter	1-pithouse?, trash scatterr
Sample Type	all-observed	2x2 m
No. in Sample	98	324
Decorated/Utility	30.6/69.4	22.5/77.5
Graywares/Brownwares	16.2/83.8	50.6/49.4
Whitewares/Redwares	100/0	95.9/4.1
Bowls/Jars	20.8/79.2	N/A
Decorated Bowls/Jars	25/75	96/4

Unfortunately, with only two sites providing evidence, few patterns can be recognized for Basketmaker III-Pueblo I ceramic assemblages. It does appear that Cheap Johns Village may be the earlier of the two sites, as it lacks the neckbanded wares and Red Mesa Black-on-white. The variety of Mogollon wares may suggest functional, social, and/or temporal differences between sites 316 and 429. Cheap Johns assemblage compares to the assemblages from Basketmaker III and Pueblo I components on the Cerro Colorado site (Bullard 1962) in several respects. At the latter, graywares make up 90 to 95 percent of the utility wares in the Basketmaker III assemblage, and Lino Red Wash and La Plata Black-on-white are the only decorated wares. Brownwares are 80 percent of the utility ware sherds in the Pueblo I assemblage at this site, and Three Circle Black-on-white and Mogollon Red-on-brown are present along with small percentages of San Francisco Red and White Mound Black-on-white. The gray/brown ware proportions at Site 316 more closely resemble those of the Cerro Colorado Pueblo I assemblage.

The decorated wares would indicate either temporal period, but the presence of Red Mesa Black-on-white sherds suggests a later occupation for Site 316. The sample from Cheap Johns Village also has characteristics of Basketmaker III and Pueblo I components at Cerro Colorado. The gray/brown ware proportion in assemblages at Cheap Johns Village is between those of Basketmaker III and Pueblo I components at Cerro Colorado, and the decorated wares include both the Basketmaker III and the Pueblo I types. In contrast to the pattern noted by Berman (1979) of Basketmaker III sites situated in upland settings, Cheap Johns Village and Site 316 are situated on an alluvial floodplain and on a low bench above an alluvial flat, respectively.

The presence of Cheap Johns Black-on-white is described and illustrated in the methodology portion of this chapter, but deserves further discussion here. The ceramics at Cheap Johns Village were first recorded by Whalen (1979) who classified these decorated sherds as La Plata Black-on-white. The site was visited by Reggie Wiseman in 1980 (BLM field notes), who concluded that the pottery identified as La Plata Black-on-white by Whalen was more likely Kiatuthlanna Black-on-white. A third alternative (see Ceramic Typology section), Cheap Johns Black-on-white, is believed to be a local variety of early Pueblo I style pottery; it may more adequately categorize the black-on-white ceramics at this site. The sherds have several technological and stylistic attributes similar to other contemporary Cibola whitewares. Their technological and stylistic attributes are also similar to contemporary Mogollon decorated wares. Tempering materials and slip more closely resemble the Cibola whitewares, but the bumpy surface finish and designs are reminiscent of Mogollon Red-on-brown.

Without additional investigation of ceramics at the site and in the surrounding region, the adequacy of a Cheap Johns Black-on-white type cannot be evaluated. The identification of such a type, one that incorporates attributes of Cibola and Mogollon Pueblo I ceramics, could be pivotal to understanding variations in ceramic production technology and resolving questions concerning local manufacture of gray and brown wares in this region during late Basketmaker III and early Pueblo I times.

Basketmaker III-Pueblo II Samples

Two sites are recorded which yielded evidence of multiple occupations dating from Basketmaker III to Pueblo II times. Only three sherds are present at Site 498, and they may have been transported or eroded from Site 499. They are a Lino Black-on-gray bowl sherd, Puerco Black-on-white jar sherd, and an unidentified whiteware jar sherd. These sherds occur in a low density prehistoric artifact scatter at a historic homestead.

Ash stains and burned rock slabs exposed in a road cut in Site 499 suggest hearths and/or structural features. An all-observed sample taken at Site 499 recorded a total of 36 sherds. Table 5.11 lists the frequency and percentage of sherd types recorded at the two sites.

Few comparisons can be made with this small sample. The graywares comprise 95 percent of the utility wares and the decorated wares roughly 50 percent of the assemblage at Site 499.

Table 5.11: Basketmaker III-Pueblo II Ceramic Assemblages				
	Site 498		Site 499	
Pottery Types	No.	Percent	No.	Percent
Lino B/G	1	33.3		
La Plata/Kana'a/Whitemound B/W			3	8.3
Puerco B/W	1	33.3		
Reserve B/W			2	5.5
Gallup B/W			2	5.5
Unidentified Solid B/W			1	2.8
Unidentified Whiteware Body Sherds	1	33.3	7	19.4
Wingate B/R			2	5.5
Plain Corrugated Brownware			1	2.8
Lino Gray			17	5.9
Plain Gray Body Sherd			1	2.8
TOTAL SAMPLE	3		36	

Pueblo I Samples

A single site may represent a Pueblo I occupation, i.e. Site 226, which is a sherd and lithic scatter associated with a hearth but without surface indications of structural features. Table 5.12 lists the ceramic types in the assemblage. A high proportion of decorated ware is present, while brownwares are represented by a single sherd, and redwares are absent. Jar sherds make up 91 percent of the sample, 61 percent of the decorated ware sherds. Utility ware in the Pueblo I assemblage at Cerro Colorado is 20 percent grayware and 80 percent brownwares.

At Site 486, a Pueblo I site excavated by McGimsey (1980:267-277), the utility wares are represented by 30 percent graywares and 70 percent brownwares. In comparison, the Site 226 assemblage is not similar to known Pueblo I assemblages in the Mariana Mesa and Cerro Colorado areas.

Table 5.12: Pueblo I Ceramic Assemblage		
	Site 226	
Pottery Types	No.	Percent
La Plata/Kana'a, Whitemound B/W	1	.7
Kiatuthlanna B/W	2	1.4
Red Mesa B/W	16	11.3
Unident. Whiteware Body Sherds	9	6.4
Plain Brown	1	.7
Lino Plain	2	1.4
Kana'a Neckbanded	6	4.2
Plain Gray Body Sherds	85	60.3
Clapboard Grayware	14	9.9
Neck Corrugated Grayware	5	3.5
TOTAL SAMPLE	141	

Pueblo I-Pueblo II Samples

Pueblo I-II ceramic assemblages are indicated by 47 samples. It is not possible to determine from present data whether sites and proveniences from which these samples were obtained represent reuse of locations during Pueblo I and Pueblo II periods, or whether they

represent occupations spanning A.D. 750 to 1150, or both. The site features are primarily residential; 58 percent of the locations sampled contain masonry, slab, jacal, and/or pithouse structures. Nonstructural lithic and ceramic scatters make up 19 percent of the sampled locations, 11 percent of the scatters are associated with hearths, and another 11 percent of the scatters are also associated with surface indications of structural remains.

Table 5.13 lists ceramic types in assemblages at Pueblo I-II sites and proveniences. The most abundant decorated wares are Reserve Black-on-white and Red Mesa Black-on-white. Lesser percentages of Reserve/Tularosa Black-on-white, Puerco Black-on-white, Gallup Black-on-white, La Plata/Kana'a/White Mound Black-on-white, and Kiatuthlanna Black-on-white are also present. Redwares average about five percent or less of each assemblage. In the utility ware category, plain gray body sherds and Lino Plain occur at highest frequencies, followed by Indented Corrugated Graywares, Plain Polished Brownware, and Clapboard Grayware.

The relative proportions of different ware categories, as well as bowl and jar sherd proportions are illustrated in Figure 5.10. Utility wares are more abundant than decorated wares in 64 percent of the samples, while in 36 percent of the samples decorated wares occur in higher proportions. Although there is a considerable spread, almost half of the samples are composed of 90 percent or more graywares (Figure 5.10b). Most of the samples do not contain redwares, and 26 percent contain from five to 10 percent redwares (Figure 5.10c). With one exception, jar sherds significantly outnumber bowl sherds in samples (Figure 5.10d). Decorated jar sherds are also more abundant in samples.

There do not appear to be great differences in the grayware and vessel form proportions when samples are segregated by the kinds of features present at sites or proveniences (Figure 5.11). However, samples from structural contexts do not contain less than 20 percent decorated wares, while almost half of the nonstructural samples are dominated by utility wares (Figure 5.11a); in addition, more nonstructural samples have higher proportions of graywares than brownwares.

Pueblo II Samples

The Pueblo II period is represented by 52 samples, which comprise the largest sample group and contain few or no ceramics diagnostic of earlier or later periods. However, sampled locations do not necessarily represent single occupations. The Pueblo II period spans about 200 years in this region, and most cer-

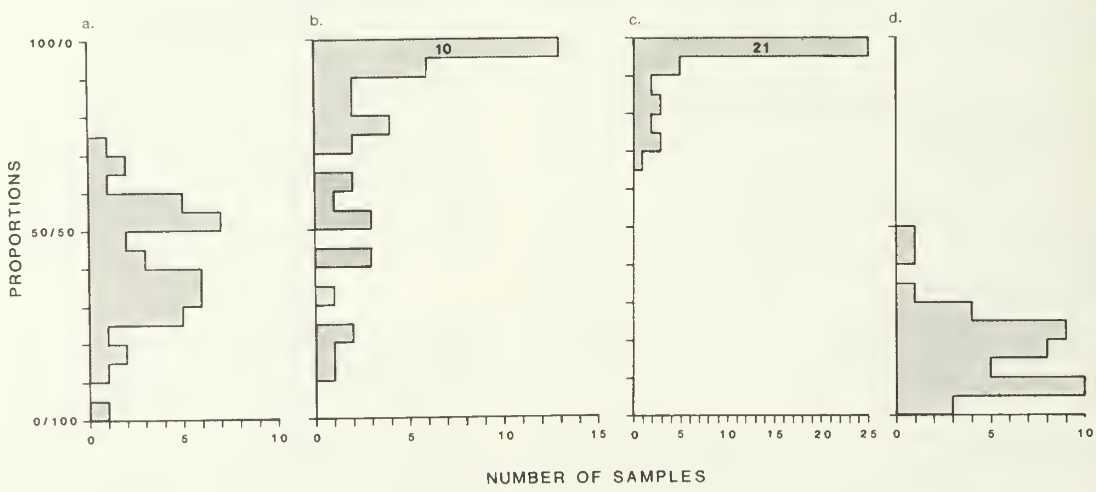


Figure 5.10: Pueblo I-II samples: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. white/red ware sherd porportions, d. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

Table 5.13: Pueblo I-II Ceramic Assemblages

Pottery Type	Site -	1	225	229	229	230	231	246	246	247	251	253	265	266	270	270
	Provenience -	1	2	1	1	1	1	1	2	1	1	1	1	1	5	9
	Sample -	ref	ref	ref	ref	ref	ref	ref	rmbl	midd	rmbl	trsh	ref	trsh	ref	rmbl
Mogollon R/B																
LaPlt/Kana'a/WtMd B/W				3.1										4.0	1.0	0.8
Kiatutnianna B/W				2.6								2.3				
Red Mesa B/W			9.4	19.3	6.0		4.5			8.8	4.1	18.6		2.7	26.6	3.7
Puerco B/W													4.0			
Escavada B/W																
Reserve B/W			6.2	0.8	14.6	7.7	9.1		13.0	38.2	36.1			8.0	14.5	29.6
Mimbres B/W																
Reserve/Tularosa B/W						15.4										
Gallup B/W						7.7									0.8	
Unidt. Solid B/W				5.7	3.4						2.9		2.3		4.2	3.2
Unidt. Hatchure B/W					1.7										1.1	2.4
Unidt. WtWr Body			12.5	15.6	13.8	19.2	13.6			23.5	34.0	22.1		14.4	21.0	29.6
San Francisco Red																
Puerco B/R				1.2	0.9	3.8										
Wingate B/R															0.8	
Unident. W.M.R.W.							4.5						4.0			
Plain Brown										11.8				3.2	0.8	
Plain Polish Brown					3.8			21.7		1.0	16.3	4.0	15.9	4.0	7.4	
Neckbanded Brown												1.2		2.1		
Plain Corr. Brown					0.4					2.9	3.1			3.2	0.8	
Indent. Corr. Brown														0.8		
Patnd. Corr. Brown																
Tooled Corr. Brown												1.2			0.8	3.7
Unidt. Brown																
Lino Gray		50.0			1.7									12.0		6.4
Kana'a Neckbanded						7.7						7.0	1.1	5.6	7.4	8.1
Plain Gray Body			34.3	42.6	27.6	11.5			21.7	11.8	8.2	25.6	48.0	16.5	4.0	11.1
Plain Corr. Gray					0.9	3.8										
Clapboard Gray			18.7	13.5	15.5	7.7		100	26.1		1.0	1.2	18.6			
Indent. Corr. Gray		50.0	15.6		7.7	11.5	68.2		17.4		11.3		8.0	3.7	6.4	3.7
Unidt. Gray					2.6							1.2	16.0			
Neck Corr. Gray				0.8	0.9						1.0			3.7		
Sample Total		2	32	244	116	26	22	14	92	34	97	86	25	188	124	27

* Based on samples in which type is present.

Table 5.13: Pueblo I-II Ceramic Assemblages (Continued)

Pottery Type / Site -	270	270	270	270	270	270	270	270	270	273	274	276	277	279	280
Provenience -	9	9	12	12	17	17	18	18	22	4	1	1	1	1	1
Sample -	pit	rm	rmbl	pit	pit	trsh	pit	trsh	ref	trsh	trsh	ref	ref	ref	ref
Mogollon R/B								0.5							
LaPlt/Kana'a/WtMd B/W							2.7	0.5	2.0	3.3	0.4				
Kiatutnianna B/W	3.7								1.0	0.5					
Red Mesa B/W	7.0	17.2	5.8	16.9	18.9	15.1	17.0	17.7	18.0	9.8	9.0	41.2	4.5	16.7	8.0
Puerco B/W								0.5							0.6
Escavada B/W										0.9					
Reserve B/W	7.0	20.7	20.7	5.2	0.7	2.7		6.1	11.0	2.3	0.4	5.9	4.5		17.8
Mimbres B/W											1.1				
Reserve/Tularosa B/W															
Gallup B/W			0.8	0.6						4.2					1.2
Unidt. Solid B/W	2.3		2.5	3.2	4.3	6.2	0.9	0.5	3.0	10.7		5.9	4.5		2.4
Unidt. Hatchure B/W	2.3	6.9	2.5	0.6				0.5	1.0	2.8					1.2
Unidt. WtWr Body	17.4	13.8	9.9	10.4	6.1	10.3	8.0	10.1	23.0	10.7	26.9	17.6	36.4	40.0	22.7
San Francisco Red				0.6											
Puerco B/R			2.5			0.7		0.5							
Wingate B/R															
Unident. W.M.R.W.														6.7	
Plain Brown					6.1	4.8	4.5	3.0		0.5					
Plain Polish Brown	13.9	6.9	22.3	31.2	17.6	10.3	6.2	9.6	3.0		14.0		4.5		
Neckbanded Brown		10.3	3.3	1.3	3.4	0.7	1.8	3.0		0.5	2.5				
Plain Corr. Brown	16.3		5.8	7.8		9.6	0.9	8.6							0.6
Indent. Corr. Brown	4.6			1.3				13.1							
Patnd. Corr. Brown			1.6					1.5							
Tooled Corr. Brown		3.4	3.3	3.9	0.7	1.4		1.0							
Unidt. Brown															
Lino Gray				1.3	31.7	19.9	47.3	22.2	12.0			2.9	9.1		
Kana'a Neckbanded		4.8	2.6	8.8	5.5	9.8			6.0		14.0		18.2		13.5
Plain Gray Body	20.9	13.8	9.1	9.1					19.0	38.3		11.8	18.2	26.7	29.4
Plain Corr. Gray							0.9			5.1		2.9			1.2
Clapboard Gray	3.4		3.9		2.7		1.5		1.0	10.3	0.3	11.8			
Indent. Corr. Gray		3.4	4.9	0.6	1.3	10.3					1.1				1.2
Unidt. Gray															
Neck Corr. Gray															
Sample Total	86	142	121	155	148	146	112	198	101	214	279	34	22	15	163

Table 5.13: Pueblo I-II Ceramic Assemblages (Continued)

Site -	280	281	281	291	291	291	294	317	324	325	450	450	464	476	490	491	491	
Provenience -	4	1	2	1	2	3	1	1	1	1	1	1	1	1	1	1	1	Mean
Pottery Type / Sample -	ref	ref	ref	trsh	pit	ref	ref	ref	trsh	ref	ref	ref	ref	ref	ref	ref	ref	Percent
Mogollon R/B																	0.5	0.5
LaPlt/Kana'a/WtMd B/W									0.9									2.1
Kiatutnianna B/W						2.0			0.4									1.8
Red Mesa B/W	7.1	10.0		2.3	17.1	37.8	16.7	15.5	12.9	10.0	0.7		9.1	4.2		15.4	2.9	12.5
Puerco B/W								2.8					9.1		4.3	11.5	2.9	4.5
Escavada B/W																		0.9
Reserve B/W	14.3	8.3	8.3	11.1		4.7	16.7	5.6		20.0		94.1	36.4	16.9	15.0	46.1	9.8	15.4
Mimbres B/W																		1.1
Reserve/Tularosa B/W				4.2			33.3									3.8		7.8
Gallup B/W		0.8														3.8		2.5
Unidt. Solid B/W		2.5			6.6	1.3											1.0	3.6
Unidt. Hatchure B/W								4.2		20.0								2.3
Unidt. WtWr Body	42.8	15.8	8.3	10.2	3.3	26.3	33.3	38.0	14.7	40.0	0.7		9.1	3.9	10.7		9.8	19.7
San Francisco Red																		0.6
Puerco B/R				1.8												11.5		3.0
Wingate B/R				1.4		0.7										0.7		3.1
Unident. W.M.R.W.										10.0								5.1
Plain Brown			0.9	7.9	3.3			2.8	0.9		19.8				1.1			4.8
Plain Polish Brown		2.5	0.9	1.8	3.8			15.5	1.8		2.9						1.0	9.0
Neckbanded Brown																		2.5
Plain Corr. Brown		0.8		14.3	8.1				0.9		22.1							5.3
Indent. Corr. Brown				7.9							1.5							4.9
Patnd. Corr. Brown				2.3														1.1
Tooled Corr. Brown		1.7																2.0
Unidt. Brown				0.5														0.5
Lino Gray			46.8		43.6	6.7		8.4				5.9					1.0	14.0
Kana'a Neckbanded		7.5	16.5	0.5	10.9	6.1		4.2	10.7				18.2	20.8				8.6
Plain Gray Body	35.7	34.2	15.6			9.5		2.8	54.5		19.1		18.2	45.4	18.3		16.7	22.1
Plain Corr. Gray			0.9		0.5	2.0			2.2									2.3
Clapboard Gray											33.1				2.1		8.8	8.2
Indent. Corr. Gray		15.8	1.8		2.8	2.7								7.8	48.4		46.0	12.5
Unidt. Gray																		6.6
Neck Corr. Gray																		1.3
Sample Total	14	120	109	216	211	148	6	71	224	10	136	17	11	77	93	26	128	4,682

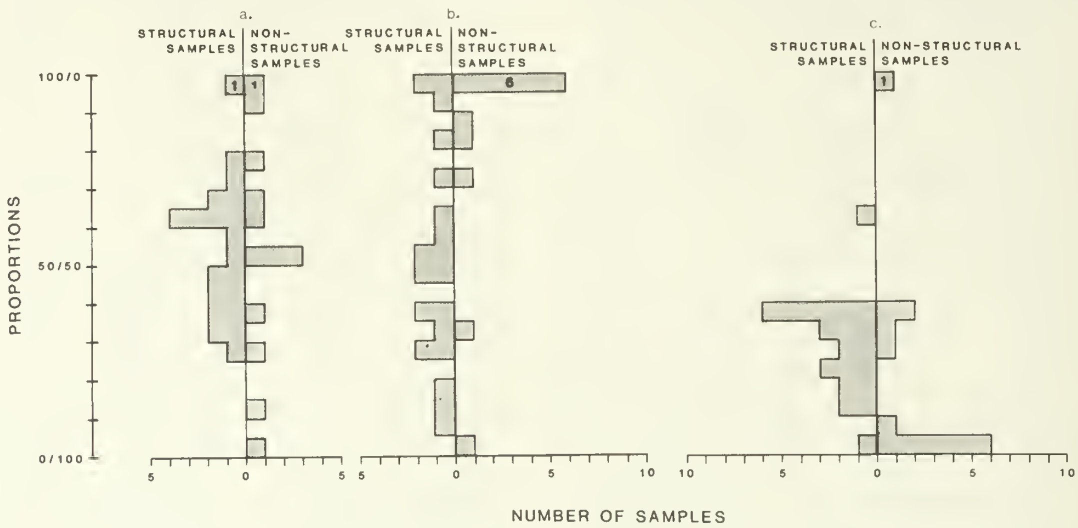


Figure 5.11: Pueblo I-II samples from structural and nonstructural site/proveniences: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

tainly some of the proveniences represent multiple occupations during this period. Furthermore, the specific temporal associations of many of the sampled pottery types in this region are not well understood.

Most of the Pueblo II samples (73 percent) are from sites or proveniences containing structural features. Structures at proveniences include large masonry pueblos and kivas, smaller masonry or jacal pueblos, and one- or two-room masonry and slab units commonly referred to as "field houses." The majority of these structures may indicate seasonal or temporary use. Masonry pueblos composed of three or four to eight rooms, with definable midden deposits may be permanent (year-round) residential occupations. Sites 227, 228, 248, 314, 328, 453, 467, and 469 are examples of such sites. Site 331 and provenience 20 at Site 170 contain large masonry complexes.

The smaller, seasonal or temporary residences might be represented by one to two or three masonry or jacal/masonry units associated with low-density artifact scatters. Sites 255, 257, 318, 321, 329, and 479 contain such features. The remainder of the ceramic sample (27 percent) was recovered from nonstructural ceramic and lithic scatters some of which are associated with hearths and small slab features.

Table 5.14 lists the percentages of all pottery types recorded for each Pueblo II sample. Pueblo II assemblages are characterized by a predominance of Indented Corrugated Graywares and Reserve Black-on-white sherds. Reserve/Tularosa Black-on-white, comprises from two to seven percent of the sherds in the samples, the remainder of the identifiable decorated whitewares being present in very low percentages. White Mountain Redwares comprise an average of five percent of the sherds in the samples, with Puerco Black-on-red and Wingate Black-on-red almost equally represented. Brownwares represented by Plain Brown, Polished Brown, and Plain Corrugated are present in samples in similar percentages. The brownwares as a whole, comprise an average of 20 percent of the sherds in the Pueblo II ceramic samples. Graywares, dominated by Indented Corrugated and Plain Gray body sherds, comprise an average of 60 percent of the recorded sherds. The relative proportions of different wares and the proportions of bowl and jar sherds are shown in Figure 5.12. The utility wares outnumber decorated wares (Figure

Table 5.14: Pueblo II Ceramic Assemblages

Site -	3	227	227	228	239	239	248	248	250	254	255	260	270	270	270	273	274	275
Provenience -	1	1	1	1	1	1	1	1	1	1	1	1	1	20	20	21	1	1
Pottery Sample / Sample -	ref	ref	ref	ref	ref	ref	rm	midd	rm	ref	rmbl	ref	ref	midd	rm	ref	rmbl	ref
LaPlt/Kana'a/WtMd B/W																		
Red Mesa B/W		10.8	0.9				2.2	2.0								7.8	5.9	8.2
Puerco B/W			0.9													0.6		
Escavada B/W																2.4		
Reserve B/W			2.7	19.4	8.2		35.9	25.5	47.3	40.0	17.2	60.0	17.9	23.0	29.5	8.4	11.8	6.8
Socorro B/W																		
Gallup B/W			0.9	0.4												1.8		0.7
Reserve/Tularosa B/W										2.9			2.0	4.2				
Tularosa B/W										2.9			0.8	1.9				
Unident. Solid B/W		2.7	0.9	1.6			1.1						6.4	8.0		2.4	4.4	4.8
Unident. Hatch B/W				.4									2.3	4.2		1.2		0.7
Unident. Body Sherd		13.5	10.9	12.1	10.2		28.3	25.5	12.2	25.7	37.9		9.8	7.5	28.2	15.1	17.0	21.2
Puerco B/R					4.1								1.1	2.3	1.3			
Wingate B/R												20.0	1.1	3.8				
Wingate Poly.														0.5				
St. Johns B/R														0.5				
Unident. W.M.R.W.				1.2		66.7							2.4	10.8				
Plain Brown							7.6	1.9					2.9	1.4		1.2		2.0
Polished Brown			0.9				2.2	7.8	12.2	2.9	3.4		3.2	2.3	11.5		1.9	0.7
Neck Banded Brown								2.0					0.8	0.5	7.7			
Plain Corr. Brown							2.2	9.8	2.7				14.2	6.6	9.0			
Indent. Corr. Brown							1.1	9.8					19.6	13.1	5.1	2.4		
Patterned Corr. Brown													1.8					
Tooled Corr. Brown														0.5				
Fillet Rim Brown													0.5					
Unident. Brown													0.8	0.9				
Gray/Brown Brown																		
Lino Gray			1.8															
Kana'a Neckbanded		2.7								2.9	3.4						6.7	15.7
Plain Gray Body		24.3	50.0	24.3	36.7		6.5	7.8	16.2	11.4	24.1		1.4	0.5	2.6	36.7	24.4	35.6
Plain Corr. Gray		2.7		4.4	2.0					2.9			0.5			1.8	10.4	
Clapboard Gray		16.2	5.4	3.6							6.9		0.5		3.8	10.2	14.1	1.4
Indent. Corr. Gray	100	18.9	24.5	31.6	38.8	33.3	13.0	7.8	9.5	8.6	6.9	20.0	10.2	7.5	1.3	7.8	3.7	2.0
Indent. Gray																		
Neck Corr. Gray		8.1		0.8														
SAMPLE TOTALS	1	37	147	247	49	3	92	51	74	35	39	5	654	213	178	166	135	146

*Based on samples in which type is present.

Table 5.14: Pueblo II Ceramic Assemblages (Continued)

Site -	280	313	314	318	319	321	322	328	329	331	331	331	331	331	429	453	455	456
Provenience -	3	2	1	1	1	1	1	1	1	1	2	3	4	5	2	1	1	1
Pottery Sample / Sample -	ref	rmbl	ref	midd	ref	ref	ref	ref	ref	rmbl	midd	dmp	midd	erth	rmbl	ref	ref	ref
LaPlt/Kana'a/WtMd B/W										0.2								
Red Mesa B/W	2.9							1.7		0.6						1.2		
Puerco B/W						1.0					0.4					4.8	3.1	
Escavada B/W	2.9																2.0	
Reserve B/W	15.5	16.7	17.2	31.6	21.4	40.6	55.6	18.3	14.3	12.2	11.1	3.8	12.2	22.7	9.6	1.2	17.3	3.4
Socorro B/W										0.9	0.8		1.0					
Gallup B/W	2.9		0.8					0.4						0.4		2.4	1.0	
Reserve/Tularosa B/W						5.2		3.0		13.0	10.7	15.4	5.9	6.1				8.6
Tularosa B/W								0.4		1.7		3.8						5.2
Unident. Solid B/W	3.9		1.9					0.8		3.0	0.4		4.4	0.8	3.8	4.8	11.2	15.5
Unident. Hatch B/W			1.1					0.4		0.2	3.0				1.9	3.6	2.0	
Unident. Body Sherd	11.6	50.0	11.5		7.1	12.5	22.2	14.0	28.6	9.8	4.7	1.5	5.4	14.8	21.1	9.5	13.3	8.6
Puerco B/R								3.0	14.3	1.5				0.4	3.8			
Wingate B/R			1.1					0.4		7.4	3.0			1.1	1.9		1.0	1.7
Wingate Poly.										0.4								1.7
St. Johns B/R																		
Unident. W.M.R.W.			0.8							6.1	2.6		2.0	1.1	9.6		1.0	5.2
Plain Brown			1.1								2.7	3.8	1.0	1.5	1.9	23.8	9.2	20.7
Polished Brown			11.1	26.3	10.7	3.1	11.1	1.3		5.4	6.8	15.4	11.3	0.8	5.8	9.5	5.1	1.7
Neck Banded Brown			0.4													3.6		
Plain Corr. Brown			10.0							5.4	6.8		2.4		1.9	1.2	4.1	13.8
Indent. Corr. Brown			4.2			1.0		1.3		10.4	8.5	?1.5	1.0	0.4	1.9	1.2		6.9
Patterned Corr. Brown			0.8	5.3	1.8					2.4			0.5	0.4			8.2	
Tooled Corr. Brown			0.4					0.4			4.0		0.5			1.2		
Fillet Rim Brown			0.4		1.8												1.0	
Unident. Brown			0.4															
Gray/Brown Brown			2.3			6.2				1.5	1.3							
Lino Gray							11.1			0.2				1.5		26.2		
Kana'a Neckbanded		33.3			1.8													
Plain Gray Body	43.7		5.7	15.8	1.8	1.0		15.3	14.3	3.0	1.7	15.4	8.3	7.2	23.1		2.0	1.7
Plain Corr. Gray	2.9							0.8		0.4	1.3		1.0				1.0	
Clapboard Gray	10.7		1.1	21.0							1.7	11.5		3.4		5.9	1.0	
Indent. Corr. Gray	2.9		27.6		51.7	29.2		38.3	28.6	13.9	32.0	7.7	43.1	37.5	13.5		16.3	5.2
Indent. Gray					1.8													
Neck Corr. Gray																		
SAMPLE TOTALS	103	6	261	19	56	96	9	235	7	460	234	26	204	264	52	84	98	58

Table 5.14: Pueblo II Ceramic Assemblages (Continued)

Pottery Sample / Site -	457	460	462	467	469	469	470	471	473	473	474	478	479	482	489	495	
Provenience -	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Mean
Sample -	ref	ref	midd	midd	rmbl	ref	ref	ref	ref	rmbl	ref	ref	ref	ref	ref	ref	Percent*
LaPlt/Kana'a/WtMd B/W																	0.2
Red Mesa B/W			1.5							1.6		1.6					3.5
Puerco B/W		5.3	6.0														3.2
Escavada B/W																	2.4
Reserve B/W	4.3	21.0	17.9	15.8	8.7	20.4		4.6	38.7	23.3	19.4	7.8	18.9	21.0	100.	66.7	22.2
Socorro B/W																	0.9
Gallup B/W			3.0										1.9				1.4
Reserve/Tularosa B/W	8.6	10.5	8.9					7.7			2.8						7.2
Tularosa B/W																	2.4
Unident. Solid B/W	10.0			3.7		9.3		1.5						5.3		33.3	5.0
Unident. Hatch B/W				1.2		1.8											1.7
Unident. Body Sherd	14.3	26.3	10.4	4.9	4.3	1.8		9.2	6.4	11.6	8.3	4.7	15.1	26.3			15.0
Puerco B/R									1.6		2.8	4.7					3.2
Wingate B/R	5.7		1.5					6.1	1.6								3.6
Wingate Poly.																	0.9
St. Johns B/R																	0.5
Unident. W.M.R.W.	11.4								3.2								8.9
Plain Brown	1.4		1.5	11.0						4.6							5.3
Polished Brown			8.9			5.6			8.1		11.1	3.1					5.8
Neck Banded Brown																	2.5
Plain Corr. Brown	4.3		3.0			3.7			3.2								5.2
Indent. Corr. Brown			1.5			1.8					5.6						3.8
Patterned Corr. Brown												1.6					2.7
Tooled Corr. Brown										2.3		1.6					0.9
Fillet Rim Brown																	0.7
Unident. Brown																	0.7
Gray/Brown Brown																	2.8
Lino Gray																	8.2
Kana'a Neckbanded		5.3		1.2						2.3			5.7				7.4
Plain Gray Body		31.6	8.9	36.6	4.3	11.1	57.1	3.1	3.2	11.6	5.6	21.9	32.1	5.3			15.1
Plain Corr. Gray	40.0				8.7	13.0			6.4			3.1	1.9				5.5
Clapboard Gray						3.7				4.6			11.3				5.3
Indent. Corr. Gray			26.9	25.6	73.9	27.7	22.9	67.7	25.8	39.5	44.4	50.0	13.2	42.1			26.1
Indent. Gray																	1.?
Neck Corr. Gray							20.0										9.6
SAMPLE TOTALS	70	19	67	82	23	54	35	65	62	43	36	64	53	19	2	3	5231

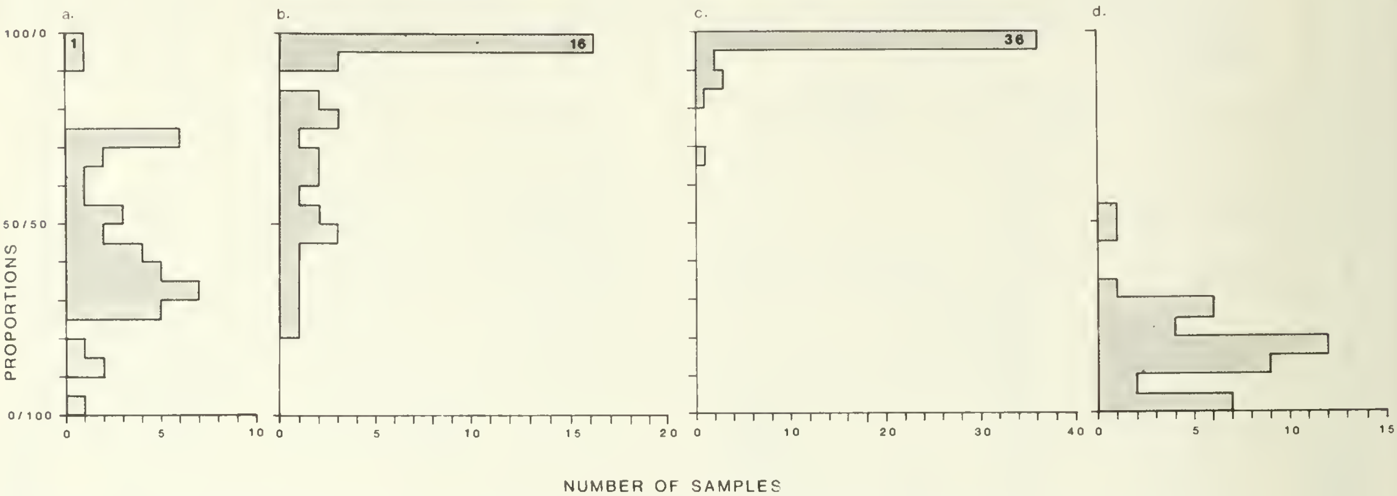


Figure 5.12: Pueblo II samples: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. white/red ware sherd porportions, d. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

5.12a) – decorated wares averaging 42 percent and utility wares 58 percent of the sherds in samples. In over 80 percent of the samples, the graywares are more abundant than brownwares (Figure 5.12b); the average proportions of graywares and brownwares being 75/25 percent. Whitewares consistently make up higher proportions of decorated sherds than do redwares (Figure 5.12c), with the latter averaging approximately seven percent of the decorated sherds. Jar sherds outnumber bowl sherds in almost all of the samples; jars and bowls average 83 percent and 17 percent respectively (Figure 5.12d). Not shown in the figures are decorated bowl/jar sherd proportions which average 28/72 percent.

Figure 5.13 show ware proportions in Pueblo II assemblages which have been segregated into structural and nonstructural groups, i.e. scatters associated with structures and artifact scatters or hearth areas. There is a difference in decorated/utility ware proportions between these two classes of sites (Figure 5.13a). The samples from nonstructural contexts are extremely variable, ranging from those with 100 percent decorated wares to those with no decorated wares. The smaller size and fewer numbers of nonstructural samples may account, in part, for the variability among samples. The decorated/utility ware proportions from scatters with associated structures exhibit less variability, with samples tending to contain less than 60 percent decorated wares. The proportions of gray and brown wares are similar for both structural and nonstructural sites (Figure 5.13b) and indicate a trend toward a predominance of graywares in samples. Bowl and jar sherd proportions at both site classes are also similar with more jar than bowl sherds present in samples (Figure 5.13c).

In summary, Pueblo II ceramic assemblages tend to contain decorated wares predominated by Reserve Black-on-white and gray utility wares, and average less than 10 percent redwares. Brownwares make up slightly less than 25 percent of utility wares in samples, while jar sherds are more numerous than bowl sherds in almost every sample.

Pueblo II-Pueblo III Samples

There are 32 ceramic samples representing assemblages from the Pueblo II-III period. The pottery types in these samples contain types which occur in assemblages of both periods and may indicate either several temporally discrete occupations at a location or longer-term

occupations spanning Pueblo II-III times. Most of the samples (62 percent) were obtained from sites or proveniences associated with structures, while fewer (37 percent) were taken at artifact distributions lacking structures. The structural sites include large roomblocks, some with kivas (e.g. Sites 185, 163, and 330). Smaller five- to 10-room pueblos occur at Sites 233, 262, 280, 326, and 483. A few small one- to two-room masonry units such as those at Sites 234 and 235 also yielded ceramic samples. Some of the sampled artifact scatters were associated with hearths.

Pueblo II-III assemblages are characterized by a predominance of gray and brown indented corrugated wares (Table 5.15). Tularosa Black-on-white, Reserve Black-on-white, and Reserve/Tularosa Black-on-white are the predominant decorated types. Gray Indented Corrugated sherds average the largest percentage of all sherds in the samples (19 percent). Brown Indented Corrugated, Wingate Black-on-red, and Tularosa Black-on-white sherds follow at about 17 percent each. Reserve Black-on-white averages 14.3 percent in samples; the average percentages of Plain Gray body sherds, and of Reserve/Tularosa Black-on-white are lower. Redwares comprise an average of 23.5 percent of sherds in samples.

Figure 5.14a displays the relative proportions of decorated wares and utility wares in Pueblo II-III period samples. This graph indicates that the samples tend to cluster between in the 70/30 and 30/70 percent decorated/utility range, with just over half of the samples having a higher proportion of decorated wares. The average proportions of these wares are 53/47 percent.

The graph illustrating gray/brown ware proportions displays the extreme variations among the samples (Figure 5.14b). Samples do not cluster along the vertical axis of the graph; 58 percent of the samples have a greater number of graywares than brownwares. Whitewares predominate over redwares in all but one sample (Figure 5.14c), although there is a relatively large range of variability among samples. Red/white proportions in samples cluster between 65/35 and 55/45 percent and between 100/0 and 95/5 percent.

The average proportions of white to red wares are 76/23 percent. The distribution of bowl and jar sherds in Figure 5.14d indicates that jar sherds predominate in all samples; bowl/jar proportions in most samples range between 35/65 and 20/80 percent. Not illustrated are decorated bowl/jar sherd propor-

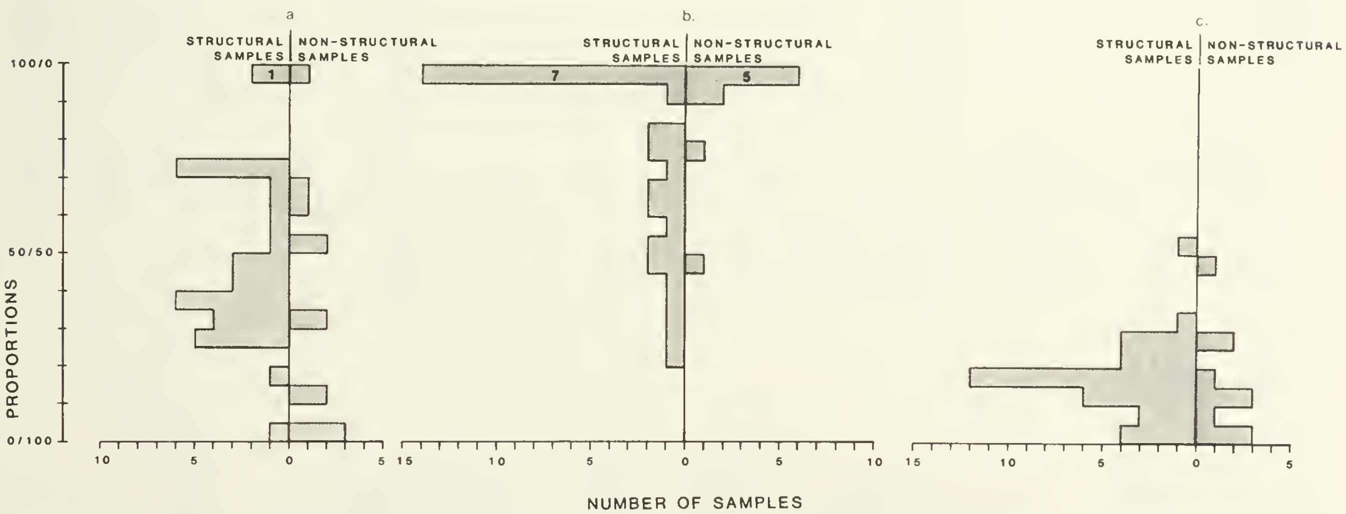


Figure 5.13: Pueblo II samples from structural and nonstructural site/proveniences: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

Table 5.15: Pueblo II-III Ceramic Assemblages

Site -	185	232	233	234	235	240	261	262	262	263	263	263	263	263	269	272	278	280
Provenience -	1	2	1	1	1	1	1	1	1	1	1	1	2	3	1	1	99	3
Pottery Type / Sample -	midd	ref	ref	midd	ref	ref	ref	rmbl	midd	rmbl	midd	rmbl	midd	rmbl	ref	ref	ref	rmbl
LaPlt/Kana'a/WtMd B/W																		
Red Mesa B/W																	3.7	
Puerco B/W																		
Reserve B/W	20.2	18.2	10.4	19.3	15.6			2.0	4.4			0.6				4.5	18.4	12.9
Socorro B/W								2.0										
Gallup B/W																		
Reserve/Tularos			3.9	3.6	7.8			14.0	3.3	3.6	3.0	11.2		1.7		3.4	7.9	12.9
Tularosa B/W			13.0	4.9		25.0	12.1	8.0		15.5	18.3	22.4	25.0	21.5		6.9	3.2	19.3
Unident. Solid B/W	12.6							4.0	2.2	5.2		9.3				6.9	6.3	
Unident. Hatch B/W	7.6							2.0	4.4	0.5		1.2				3.4		
Unident. Body WtWr	6.3		10.4	4.8	9.4			4.0	4.4	16.6	8.1	14.3		8.4		6.9	22.1	19.3
Puerco B/R									1.1	0.5						3.8		
Wingate B/R	11.4	9.1		2.4	3.1			2.0	4.4		0.9				100.			
Wingate Polychrome								2.0		1.0	0.9							
St. Johns B/R			20.8	2.4	18.7				2.2	14.0	2.5	4.3	25.0	8.9				
St. Johns Poly			2.6		4.7					2.6	10.4	5.0		6.3				
Springerville Poly			1.3															
Unident. W.M.R.W.	11.4	9.1	2.6					6.0	4.4	6.7	5.6	5.0	25.0	3.8				
Unk. R/W										0.5								
Plain Brown							15.1		3.3					1.3			2.1	
Polished Brown		9.1	1.3				21.2	2.0	2.2	1.0	0.9	1.2		0.8			0.5	3.2
Neckbanded Brown				1.2					1.1								1.0	
Plain Corr. Brown	6.3				12.5			6.0		0.5	0.7	1.2		1.3			6.3	
Indent. Corr. Brown	15.2		10.4	3.6			21.2	8.0	23.3	19.2	34.6	13.0	12.5	38.4			0.5	
Tooled Corr. Brown					1.6				3.3									
Patterned Corr. Brown											3.7	1.9						
Fillet Rim Brown											0.2			0.4				
Lino Gray																	0.5	
Kana'a Gray														0.4			1.6	6.4
Plain Gray Body		18.2	3.9	19.3	4.7		9.1	4.0	10.0	4.1	1.4	1.2		0.4		6.9	14.2	19.3
Plain Corr. Gray							3.0	2.0			0.2	0.6					1.0	
Clapboard Gray				1.2				2.0			0.2	0.6					2.6	
Indent. Corr. Gray	8.9	36.4	19.5	37.3	21.9	7.5	18.2	30.0	25.6	8.3	8.1	6.2	12.5	6.3		17.2	7.9	6.4
Unident. Gray												0.6						
SAMPLE TOTALS	79	11	77	83	64	4	33	50	90	193	431	161	8	237	2	29	190	31

Table 5.15: Pueblo II-III Ceramic Assemblages (Continued)

Site -	290	293	295	311	326	326	327	330	472	475	483	483	486	487	
Provenience -	1	2	1	3	1	3	1	1	6	1	1	1	1	1	Mean
Pottery Type Sample -	ref	ref	ref	ref	midd	midd	ref	midd	ref	ref	rmbl	ref	ref	ref	Percent*
LaPlt/Kana'a/WtMd B/W								0.4							0.4
Red Mesa B/W					2.5	1.2			1.7						2.0
Puerco B/W									0.6					20.0	10.3
Reserve B/W		22.2			8.1	6.0		4.5	6.2	50.7	20.0	8.4	3.1		14.3
Socorro B/W						1.2									1.6
Gallup B/W									0.6						0.6
Reserve/Tularos	7.2	44.4		50.0	1.2		2.1	6.7					3.1	30.0	11.0
Tularosa B/W	13.0		33.3		0.6		23.2	7.8	1.7	2.9	20.0		71.9		16.8
Unident. Solid B/W					0.6	8.4		0.7	10.1						5.4
Unident. Hatch B/W					2.5			0.4	0.6						2.5
Unident. Body WtWr	10.1				17.0	24.1	10.5	8.5	15.2			2.1	9.4		11.0
Puerco B/R												1.0	33.1		9.9
Wingate B/R			33.3					3.7				14.7			16.8
Wingate Polychrome												1.0			1.?
St. Johns B/R	13.0						8.4	2.6							10.2
St. Johns Poly	5.8						6.3	0.7	1.4						4.6
Springerville Poly							1.0								1.1
Unident. W.M.R.W.	11.6				0.6		8.4	3.7	0.6		60.0				10.3
Unk. R/W							4.2	0.4							1.7
Plain Brown					4.4			1.5							4.6
Polished Brown	1.4					1.2	3.2	5.6	0.3			24.2			4.5
Neckbanded Brown						1.2									1.1
Plain Corr. Brown					2.5		1.0	3.0							3.7
Indent. Corr. Brown	27.5				3.1		28.4	20.1		8.7		14.7			16.8
Tooled Corr. Brown															2.4
Patterned Corr. Brown							1.0	0.4							1.7
Fillet Rim Brown															0.3
Lino Gray															0.5
Kana'a Gray					10.7	3.6									4.5
Plain Gray Body	4.3				35.8	45.9		1.5	38.0	4.3					10.3
Plain Corr. Gray									2.0			4.2			1.9
Clapboard Gray									8.1			1.0			2.2
Indent. Corr. Gray	5.8	33.3	33.3	50.0	10.1	7.2	2.1	27.9	11.5	33.3		28.5	9.4	50.0	19.3
Unident. Gray									1.4						1.0
SAMPLE TOTALS	69	9	3	2	159	83	95	269	355	69	5	95	32	10	2838

Figure 5.14: Pueblo II -III samples: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. white/red ware sherd porportions, d. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

tions. Decorated wares are represented by slightly higher numbers of bowl sherds, but jar forms still predominate in samples; decorated bowl/jar proportions average 35/65 percent.

Figure 5.15 separates ware and vessel form proportions into categories depending on structural association. Interestingly, there is a relatively distinct cluster of structurally associated samples with decorated/utility ware proportions of 60/40 percent, while there is extreme variability among the nonstructural samples. This distribution may be due in part to the fact that the nonstructural samples (sherd and lithic scatters, hearth areas) are typically quite small and may represent single activity episodes rather than combinations of events as with larger samples. Over half of these samples have fewer than 15 sherds and only one has more than 100 sherds. In contrast, all but two of the samples associated with structural features have more than 15 sherds and most have more than 50 sherds. A different pattern is seen in the gray/brown ware proportions within the two sample types. The samples associated with structures are just as variable as the nonstructural samples with respect to gray/brown ware proportions. A comparison of bowl/jar sherd proportions between the two site types shows that there is a similar range evident in each set of samples. Some nonstructural samples cluster at the 95 to 100 percent jar sherds point on the graph, a distribution not present on the structural side of the graph.

In summary, the Pueblo II-III samples are highly variable with respect to ware proportions, but type percentages are quite consistent. Graywares are slightly more predominant in samples than brownwares, with Indented Corrugated gray and brown sherds the most common types. On the average, decorated and utility wares are present in almost equal proportions, with Tularosa Black-on-white, Reserve Black-on-white, and Reserve/Tularosa Black-on-white the most common types. Redwares consist mostly of bichromes, with a small percentage of polychromes present. Bowl sherds number fewer than jar sherds, though in many instances comprising 30 to 40 percent of sherds in samples.

Pueblo III Samples

A total of 11 samples have been grouped in the Pueblo III temporal category; these lack diagnostic pottery with earlier or later affiliations. Some of the samples, however, undoubtedly are the result of multiple occupations of places

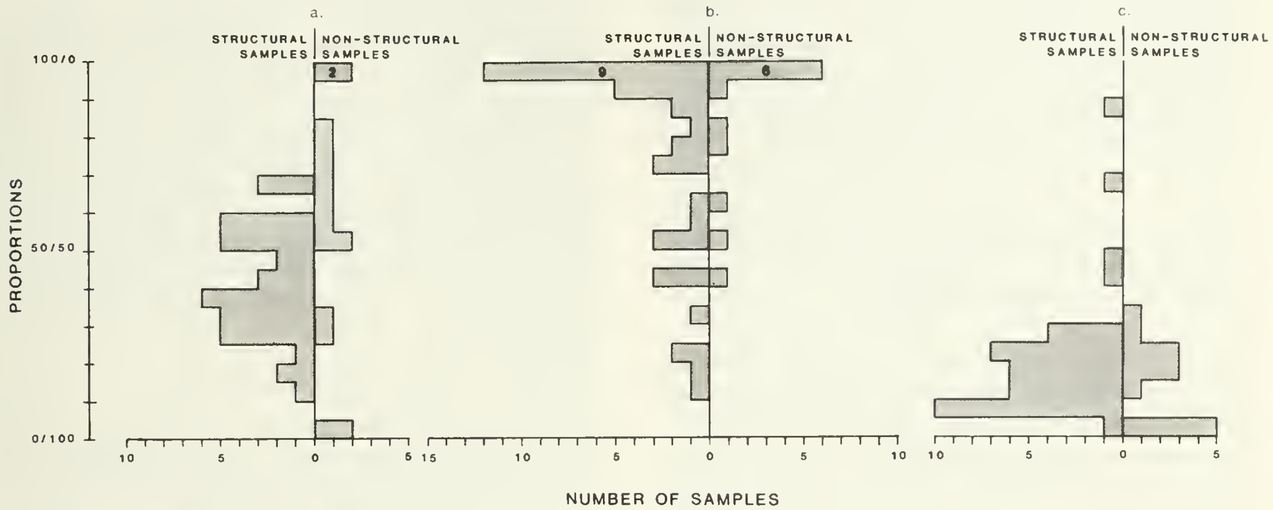


Figure 5.15: Pueblo II -III samples from structural and nonstructural site/proveniences: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

during this period. Eight are from two large masonry pueblo complexes (Sites 330 and 472), two from a moderately sized pueblo (Site 468), and one from a later provenience at a Pueblo II-III pueblo (Site 327).

Table 5.16 lists the percentages of all pottery types recorded for each Pueblo III sample. In general, these samples are characterized by a predominance of Tularosa Black-on-white sherds, followed by gray and brown Indented Corrugated types, and St. Johns bichromes and polychromes. Based on samples in which the types are present, Tularosa Black-on-white averages 25 percent of the sherds in these samples, while Gray Indented Corrugated sherds average 20 percent and Brown Indented Corrugated wares 16.1 percent. Redwares average approximately 24 percent.

Figure 5.16 illustrates the relative proportions of different wares and of bowl and jar sherds in samples. Over 72 percent of the samples are dominated by decorated wares (Figure 5.16a), with average decorated/utility percentages at 56/44. A majority of sherds in just over half of the samples are graywares. There are two fairly distinct utility ware clusters of samples in Figure 5.16b, one in which graywares make up from 80 to 100 percent and another in which brownwares range from 65 percent to almost 100 percent. The average gray/brown ware proportion is 57/43 percent. All but one of the samples contain more whitewares than redwares, and there is a cluster of samples in Figure 5.16c in which 50 to 70 percent of the decorated sherds are whitewares. A unique sample contains almost

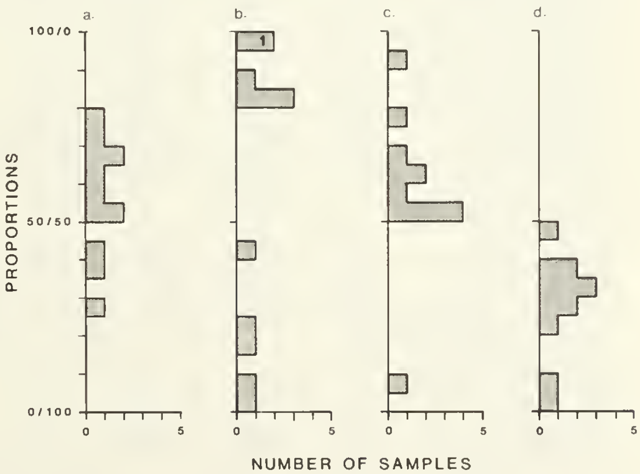


Figure 5.16: Pueblo III samples: a. decorated/utility ware sherd proportions, b. gray/brownware sherd proportions, c. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

92 percent redwares. Jar sherds are more numerous than bowl sherds in all of the samples with a group of samples containing almost 60 percent to 80 percent jar sherds. Not illustrated are decorated bowl/jar sherd proportions. In four (36 percent) of the samples, decorated bowl sherds predominate; however, the average decorated bowl/jar proportion (47/53 percent) indicates a predominance of jar vessel forms at Pueblo III period sites and proveniences.

In summary, the Pueblo III samples are characterized by a predominance of decorated wares in which Tularosa Black-on-white and St. Johns Black-on-red and St. Johns Polychrome are the main types. When the samples are averaged, graywares are slightly more numerous than brownwares. There are, however, two patterns of gray/brown ware proportions in the Pueblo III samples. For one set of sites, graywares are considerably more numerous, and for another, brownwares occur in higher proportions. The average proportions of gray and brown wares for the entire group of samples mask these patterns. Redwares average roughly 24 percent of the sherds in samples and almost 45 percent of the decorated wares. Finally, using total counts from all samples, jar forms predominate over bowl forms, the bowl/jar proportions averaging 30/70 percent. In the decorated ware category alone, an equal number of bowls and jars occur.

Pueblo III-Late Pueblo III Samples

Eight ceramic samples have been categorized as representing Pueblo III-Late Pueblo III occupations at three sites. These three sites are composed of large, multiple, masonry roomblocks. Sites 330 and 472 contain other proveniences with slightly earlier ceramic assemblages, while Site 333 appears to contain a single late Pueblo III component.

Table 5.16: Pueblo III Ceramic Assemblages

Pottery Type	327 2 midd	330 1 rmbl	330 1 midd	330 2 dnpl	330 2 dnpl	468 1 rmbl	468 1 ref	472 3 rmbl	472 4 rmbl	472 5 rmbl	472 6 rmbl	Mean Percent*
Reserve B/W		5.1								1.0	0.9	2.3
Socorro B/W	0.9											0.9
Reserve/Tularosa	9.4	7.2			10.1	4.3	2.3	9.4	4.9	3.8	6.4	
Tularosa B/W	16.6	15.4	16.1	19.7	30.7	17.2		26.0	13.1	22.5	3.8	25.8
Unident. Solid B/W		0.5	2.4	1.3				6.4	2.2	2.0	0.9	2.2
Unident. Hatch B/W								1.2	0.6	1.0	1.9	1.2
Whiteware Body	5.7	8.5	8.1	9.2	8.7	12.1		9.2		21.6	9.4	10.3
Wingate B/R	0.3	1.7	1.6					4.0		1.0		1.7
Wingate Polychrome											0.9	0.9
St. Johns B/R	1.7	10.2	12.1	10.5	11.3	8.1	25.6	11.6	1.6	13.7	6.6	10.3
St. Johns Poly.	10.9	4.3	3.2	9.2	6.8	4.0		10.4	0.9		5.7	6.1
Unident. W.M.R.W.	8.6	6.8		5.3	7.8	20.2	21.4	4.6	0.3		3.8	8.7
Other Redware						3.0					0.9	1.9
Plain Brown	3.1	0.8			1.6							1.8
Polished Brown	1.7	4.3	3.2		0.6					2.9	6.6	3.2
Plain Corr. Brown	5.1	6.0	1.6	1.3	5.8			2.3			0.9	3.3
Indent. Corr. Brown	41.3	17.9	21.8	39.5	19.4			0.6	1.2	2.0	0.9	16.1
Patterned Corr. Brown	0.6		1.6	2.6	1.9							1.7
Fillet Rim Brown							7.7			3.7	5.7	
Gray/Brown Corr.								0.3			0.3	
Kana'a Gray								0.6				0.6
Plain Gray Body	1.1	0.8	4.0		0.3			2.3		2.0	8.5	2.7
Plain Corr. Gray				0.3	2.0	1.7	0.6		0.9	9.8	3.8	2.7
Clapboard Gray										3.9	5.7	4.8
Indent. Corr. Gray	2.3	7.7	16.9	1.3	4.2	21.2	39.3	17.3	69.4	11.8	31.1	20.2
Oblit. Corr. Gray						2.0						2.0
Unident. Gray					0.3			0.6				0.4
SAMPLE TOTALS	**349**	**117**	**124**	**76**	**309**	**99**	**117**	**173**	**320**	**102**	**106**	**1,893**

* Based on samples in which type is present.

Table 5.17 lists the percentages of pottery types in each of the eight samples. As with the Pueblo III samples, Tularosa Black-on-white and Brown and Gray Indented Corrugated are the dominant pottery types. The extremely high average percentage of Wingate Black-on-red is due to a room sample from Site 472, in which 60 percent of the sample is Wingate Black-on-red. Decorated wares in the Pueblo III-Late Pueblo III samples also include St. Johns Black-on-red and St. Johns Polychrome, Reserve/Tularosa black-on-white, and small amounts of Puerco Black-on-white, Reserve Black-on-white, Gallup Black-on-white, and Wingate Polychrome. The two types which distinguish these samples as Late Pueblo III are Klageto Black-on-white and Springerville Polychrome. These two types are not present in any quantity, but appear to be characteristic of the latest prehistoric occupation recorded in this portion of the project area. Redwares comprise an average of 27 percent of the sample and brownwares roughly 20 percent. In the total Pueblo III-late Pueblo III sample, graywares average 25 percent.

In Figure 5.17, the relative proportions of different wares and of bowl and jar sherds are contrasted for samples. There is considerable variability among the decorated/utility ware samples (Figure 5.17a), with decorated ware sherds ranging from under 90 percent to just over 35 percent. Decorated sherds predominate in approximately 62 percent of the samples. Greater variability among samples can be seen in the gray/brown ware

Table 5.17: Pueblo III-Late Pueblo III Ceramic Assemblages

Pottery Type	330 3 rmbl	330 3 midd	333 1 rmbl	333 5 rmbl	472 1 rmbl	472 1 rm	472 2 rmbl	472 2 rm	Mean Percent*
Mimbres B/W						0.1			0.1
Puerco B/W					0.5	0.9			0.7
Gallup B/W					0.5				0.5
Reserve B/W					1.2	1.2			1.2
Reserve/Tularosa	0.9	1.0			8.0	5.2	1.2		3.3
Tularosa B/W	29.1	15.5	4.2	13.5	19.7	8.6	15.5	3.7	13.7
Klageto B/W			6.7	1.4		5.4			4.5
Unident. Solid B/W		1.0	0.2		3.2	1.1	7.1	1.2	2.3
Unident. Hatch B/W				1.1	1.2			1.2	1.2
Whiteware Body	12.1	8.2	8.1	6.5	10.5	10.2	11.9	19.5	9.6
Wingate B/R		1.9			2.7	8.4		59.8	18.2
Wingate Polychrome			0.2		1.5				0.8
St. Johns B/R	18.8	8.7	5.3	5.3	6.7	3.9	17.8	3.7	8.8
St. Johns Poly.	2.7	1.9	6.7	1.7	3.7	2.1	9.5		4.0
Springerville Poly.			3.7	2.8	0.7	0.4	1.2		1.8
Unident. W.M.R.W.	4.0	2.9	4.1	3.1	5.2	7.0	5.9		4.6
Unident. Redware			0.2	0.3	0.2	0.1			0.2
Plain Brown	1.3	1.9	0.2			0.5			1.0
Polished Brown	1.8	0.5	0.3	3.1	0.5	0.7			1.1
Plain Corr. Brown	3.6	8.2	0.3	3.1	1.5	1.9			3.1
Indcnt. Corr. Brown	18.4	36.9	7.9	25.1	2.0	10.2			16.7
Patterned Corr. Brown		1.0	0.2			0.1			0.4
Tooled Corr. Brown		0.5							0.5
Fillet Rim Brown			1.0						1.0
Gray/Brown Corr.			1.6	0.8	1.0	3.5	3.6		2.1
Plain Gray Body	1.3	1.5	0.2		1.0	0.4	2.4		1.1
Plain Corr. Gray					3.2	0.8			2.0
Clapboard Gray			0.2			0.1	1.2		0.7
Indent. Corr. Gray	5.8	8.2	55.5	33.5	24.2	25.1	21.4	11.0	23.1
Oblit. Corr. Gray						2.0			2.0
Unident. Gray					0.5		1.2		0.8
SAMPLE TOTALS	**223**	**206**	**657**	**360**	**400**	**747**	**84**	**82**	**2,759**

* Based on samples in which type is present.

proportions (Figure 5.17b); the proportion of graywares is 100 percent in a single sample, and just over 16 percent in another, while brownwares are the majority of utility ware sherds in only two of the samples. The proportion of redwares clusters between 35 and 55 percent (Figure 5.17c), with only one sample containing just over 71 percent redware sherds. Since redwares are usually bowls, this same sample contains more bowl than jar sherds, while the proportions of bowl sherds in the remaining samples cluster between 15 and 35 percent (Figure 5.17d).

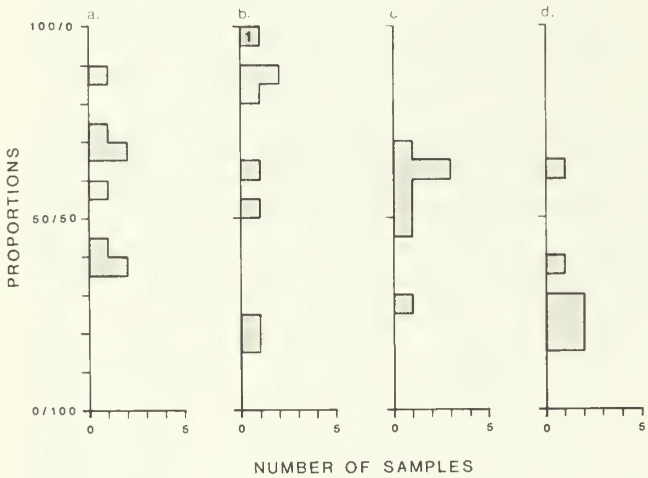


Figure 5.17: Pueblo III-late Pueblo III samples:a. decorated/utility ware sherd proportions, b. gray/brown ware sherd proportions, c. white/red ware sherd proportions, d. bowl/jar sherd proportions (samples with fewer than 15 sherds not included).

In general, these Pueblo III-late Pueblo III samples are quite similar to the Pueblo III samples, both in type content and in relative proportions of wares and vessel forms.

Only the presence of Klageto Black-on-white and Springerville Polychrome sherds clearly distinguishes these samples distinct from earlier samples. Graywares occur at slightly higher frequencies, and jar forms appear to be slightly more abundant in samples from this later period.

Pueblo I-Pueblo III Samples

Two samples have been classified as containing pottery diagnostic of Pueblo I, II, and III assemblages. These samples are from sherd and lithic scatters, at Sites 477 and 232; both lack associated architecture and other features.

The scatter on Site 477 is associated with petroglyph panels and is within a quarter of a mile of Site 232. Both scatters have low artifact densities and are situated on or below talus slopes subject to colluviation.

The ceramic samples from these two sites are listed in Table 5.18. The presence of Red Mesa Black-on-white and Kana'a Neckbanded sherds in both suggests a late Pueblo I occupation at each location.

Reserve Black-on-white, Reserve/Tularosa Black-on-white, and Indented Corrugated sherds suggest use of the sites during Pueblo II or late Pueblo II. The types indicating use during late Pueblo II and Pueblo III periods are St. Johns Black-on-red and St. Johns Polychrome.

Ware and bowl/jar proportions are shown in Table 5.19. It is difficult to assess the behavioral implications of these proportions due to the lack of associated architecture, and because they fall within the range of variability previously illustrated for all three of the temporal periods during which these locations may have been used.

Table 5.18: Pueblo I-III Ceramic Assemblages

Pottery Type	232 1 ref	477 1 ref
Red Mesa B/W	7.1	24.3
Reserve B/W	14.3	8.1
Reserve/Tularosa B/W	2.4	
Unident. White Body	11.9	21.6
Wingate B/R	2.4	
St. Johns B/R	4.8	
St. Johns Polychrome	2.7	
Indent. Corr. Brown	9.5	
Kana'a Neckbanded	11.9	10.8
Plain Gray Body	14.3	32.4
Indent. Corr. Gray	21.4	
SAMPLE TOTALS	**44.0**	**37.0**

Table 5.19: Pueblo I-III Ceramic Ware and Bowl/Jar Form Proportions

	Site No. 232	Site No. 477
Provenience	1 talus, refuse	1 refuse
Sample Type	all-observed	all-observed
No. in Sample	42	37
Decorated/ Utility Wares	42.9/57.1	56.8/43.2
Graywares/ Brownwares	83.3/16.7	100/0
Whitewares/ Redwares	83.3/16.7	95.2/4.8
Bowls/Jars	36.4/63.6	16.2/83.8
Decorated Bowls/Jars	75/25	29/71

Undated Samples

A total of 18 samples could not be confidently categorized, primarily because the pottery present at locations is not temporally diagnostic.

In addition, all but one sample contain fewer than ten sherds. Half of these undated samples are associated with hearths or possible hearth areas, seven (39 percent) were taken from sherd and lithic scatters lacking features, and two (11 percent) are associated with structures. One of these structures is a small two-room masonry unit, the other a single room masonry unit.

Table 5.20 lists the types present in each sample. Indented Corrugated Gray and unidentified whiteware body sherds, representing either Pueblo I, late Pueblo I, Pueblo II, or Pueblo III occupations, are the most common pottery in these undated samples

Several of the other types present, such as Reserve Black-on-white, Puerco Black-on-red, and Wingate Black-on-red generally indicate occupations during Pueblo II or early Pueblo III times. With such small numbers of sherds, confident temporal assignments cannot be made.

More than half of the undated samples are exclusively utility wares, while these comprise the majority of sherds in 13 of the samples. Seven samples contain only graywares; nine are predominated by graywares. There are two samples which contain exclusively brownwares. Only two samples contain redwares, and the decorated sherds in the rest of the samples are whitewares. Jar sherds form the majority in 15 samples and 12 contain exclusively jar forms.

Isolated Finds

There are 71 locations not recorded as "sites" at which 246 sherds (Table 5.21) were recorded. These isolated finds are occurrences of sherds, usually fewer than 15, which are found in eroded or otherwise questionable contexts and are not associated with hearths, structures, or other features.

Often, the sherds in an isolated find are from a single vessel. Indented Corrugated Gray and Unidentified Whiteware body sherds are the most common types recorded. Relatively high frequencies of Reserve Black-on-white and Plain Gray body sherds were also recorded, while the remaining types occur in extremely low frequencies.

The totals of all ceramics recorded at isolated locations show the proportions of decorated and utility wares to be 58.1 and 41.9 percent respectively. Graywares occur at higher frequencies than do brownwares, i.e. 87.4 percent as compared to 12.6. Proportions of whitewares and redwares are 88.1 to 11.9 percent respectively. Bowl sherds (18.9 percent) are outnumbered by jar sherds (81.1 percent).

These isolated finds generally reflect the ceramics recorded on the sites in the project area. The sherds in the isolated finds are mostly late Pueblo I, Pueblo II, and some Pueblo III wares; utility wares dominate decorated wares and graywares outnumber brown and white wares and whitewares are considerably more common than red. Jar forms dominate bowl forms.

The contents and proportions at isolated locations most closely resemble the Pueblo II assemblages, which are the most numerous samples recorded. This may further indicate that Pueblo II is the most prevalent occupation in the project area.

Table 5.20: Undated Ceramic Assemblages

Pottery Types	241 1 ref.	264 1 ref.	293 1 ref.	480 1 ref.	236 1 ref.	237 1 ref.	238 1 ref.	242 1 ref.	244 1 ref.	252 1 ref.	257 1 ref.	268 17 ref.	292 1 ref.	312 1 ref.	458 1 ref.	461 1 ref.	488 1 ref.	493 1 ref.
Reserve B/W				9.1							20.0							50.0
Unident, Whiteware Body				13.6				66.7		33.3	20.0	100	50.0	14.3				
Puerco B/R														14.3				
Wingate B/R								33.3										
Unident. W.M.R.W.				9.1														
Unident. Redware										33.3								
Plain Brown		100	100													50.0		
Polished Brown				4.5					25.5		40.0			71.4				
Indent. Corr. Brown	100																	
Plain Corr. Brown										33.3							100	
Kana'a Gray				4.5														
Plain Gray Body				22.7	50.0													50.0
Indent. Corr. Gray				36.4	50.0	100	100		75.5		20.0		50.0		100			
SAMPLE TOTALS	1	2	1	22	2	5	1	3	4	3	5	2	2	7	1	2	1	2

Table 5.21: Pottery Types and Percentages in Isolated Finds

Pottery Type	No.	Percent
Red Mesa B/W	14	5.7
Puerco B/W	1	0.4
Reserve B/W	33	13.4
Tularosa B/W	11	4.5
Reserve/Tularosa B/W	1	0.4
Unident. Solid B/W	11	4.5
Unident. Hatchure B/W	2	0.8
Unident. Whiteware Body	53	21.5
Wingate B/R	4	1.6
St. Johns B/R	1	0.4
St. Johns Polychrome	2	0.8
Springerville Polychrome	7	2.8
Unidentified W.M.R.W.	3	1.2
Plain Brown	5	2.0
Polished Brown	4	1.6
Plain Corr. Brown	2	0.8
Indent. Corr. Brown	2	0.8
Lino Plain Gray	1	0.4
Kana'a Neckbanded Gray	3	1.2
Plain Gray Body	23	9.3
Plain Corr. Gray	1	0.4
Clapboard Gray	6	2.4
Indent. Corr. Gray	56	22.8
TOTAL	**246**	**100.0**

Summary: Assemblage Variability Among Periods

Variation in the types present and relative proportions of types, wares, and vessel forms in ceramic samples is the basis for characterizing temporally distinct assemblages. Based on these attributes, a number of patterns have been identified for ceramic samples recorded from Pueblo I-II through late Pueblo III periods (Table 5.22). The paucity of Basketmaker III samples and samples reliably attributable to the Pueblo I period does not allow a very clear understanding of the contents of assemblages during these early periods. The Pueblo I-II through Pueblo III period samples are recorded in quantities sufficient to define a ceramic data base which permits recognition of patterned variability among periods. Collections from excavated (Bullard 1962; McGimsey 1980; Smith 1973) and recorded sites (Eck 1982; Elyea 1983; Hogan 1983; Moore et al. 1983) in and around the Quemado area can be compared with the surface ceramic samples from sites in the project area. The types present in these sites and the proportions of gray and brown wares in the assemblages are the attributes which can be most reliably compared. Since the issue of why brownwares and graywares co-occur on sites is of considerable interest in this region, comparing relative proportions of these wares is particularly important.

Basketmaker III single occupation sites are rare in the project area. In some cases, Basketmaker III occupations have been obscured by the material remains of later occupations. At least four sites or proveniences have been identified with Basketmaker III components; of these, two are multicomponent Basketmaker III-Pueblo II sites that have suffered considerable surface disturbance and have very low surface artifact densities. Given this condition, they are not particularly useful for defining the early ceramic assemblages, but do substantiate the presence of remains from early occupation of the area.

Although the other two Basketmaker III-Pueblo I sites provide reliable ceramic samples, they furnish a confusing picture of assemblage characteristics. They have very different ceramic assemblages and differ in site size and topographic setting as well, variations which may, in fact, be due to functional differences among Basketmaker III occupations in the area and to the complex occupational histories (the presence of multiple components) of these locations. One of these site assemblages has a mixture of Mogollon and Anasazi decorated wares with Mogollon wares dominating. Utility sherds at this site are exclusively plainwares, with gray and brown wares occurring in nearly equal quantities. A small portion of the site assemblage is made up of redwares as well. Ceramics at the other site are comprised of a low percentage of an early Mogollon decorated ware (Mogollon Red-on-brown), and a high percentage of a late Pueblo I Anasazi decorated ware (Red Mesa Black-on-white). Both plain and neckbanded gray and brownwares are present at the site, but brown wares comprise 84 percent of the utility wares.

Table 5.22: Characteristics of Pueblo I-Late Pueblo III Assemblage Samples in the SACA

	CERAMIC SAMPLE CHARACTERISTICS		Proportions				
Period	Most Common Decorated Ware Types	Most Common Utility Ware Types	Average Decorated/ Utility	Average Gray/ Brown	Average White/ Red	Average Bowl/ Jar	Number of Samples
Pueblo I	Kiatuthlanna B/W Red Mesa B/W LaPlt/Kana'a/WM BW	Plain Gray Plain and Polished Brown Neckbanded Gray and Brown	20/80	99/1	100/0	8/92	1
Pueblo I-II	Red Mesa B/W Reserve B/W	Same as above plus Indented Corrugated Gray and Brown	42/58	70/30	93/7	16/84	47
Pueblo II	Reserve B/W Reserve/Tularosa B/W	Indented Corr. Gray and Brown Plain Gray body Pl. and Pol. Brown	42/58	75/25	91/9	17/83	52
Pueblo II-III	Reserve/Tularosa B/W Reserve B/W Tularosa B/W WM R/W Bichr.	Same as above	53/47	59/40	76/23	23/77	32
Pueblo III	Tularosa B/W Reserve/Tularosa B/W St. Johns B/R & Poly	Same as above	56/44	64/36	55/45	30/70	12
Pueblo III-Late Pueblo III	Tularosa B/W St. Johns Poly Klageto B/W Springerville Poly	Same as above	58/42	64/36	55/45	30/70	8

The ceramic assemblages at the above sites are similar to the ceramics from Basketmaker III and Pueblo I components at Cerro Colorado, the only securely dated excavated site within the project area occupied during these periods. The ceramics from Basketmaker III components at Cerro Colorado are mostly Anasazi gray and decorated wares, with few brownwares and Mogollon decorated wares. No neck-corrugated sherds are associated with early levels of the site. The ceramics from the Pueblo I component consist predominately of Mogollon brown and decorated wares, including neck-corrugated sherds. A few plain gray and decorated whiteware sherds make up the rest of the assemblage.

One Pueblo I single component site has been recorded by the SACA survey. The ceramic types in this site sample include Red Mesa Black-on-white, Kiatuthlanna Black-on-white, and La Plata/Kana'a/Whitemound Black-on-white in order of descending frequency. The graywares make up 99 percent of the utility wares in the sample. These figures are not comparable with those obtained for the ceramic assemblages from the Pueblo I component at Cerro Colorado (Bullard 1962:11) or from Site 486 (McGimsey 1980:267-277), each of which contains from 70 to 80 percent brownwares. The decorated ware types, however, are similar on all three of these Pueblo I sites. The site recorded on this project is associated with hearths but not with structural features, while the features at Cerro Colorado and Site 486 include pithouses and surface structures. Therefore, functional differences among these sites as indicated by architectural remains may account for the variations in gray/brown ware proportions. The high degree of variability among Pueblo I assemblages may also result from intensive reuse of locations.

A homogenous set of pottery types is present in the samples at Pueblo I-II sites/proveniences. Almost all of the samples contain Red Mesa Black-on-white and Reserve Black-on-white sherds, with fewer sherds of Kiatuthlanna Black-on-white, La Plata/Kana'a/Whitemound Black-on-white, Reserve/Tularosa Black-on-white, Puerco Black-on-white, and Gallup Black-on-white present. The most common utility wares are Plain Gray, Neck-banded Gray, Indented Corrugated Gray, Polished Brown, Clapboard Gray, and Indented Corrugated Brown. Small amounts of redwares are present. Utility wares are more common than decorated wares; jar sherds are more common than bowl sherds. The gray/brown ware proportions vary considerably among samples, while the decorated/utility, white/red, and bowl/jar proportions are patterned. Graywares predominate in many of the samples, but utility wares are dominated by brownwares in over 20 percent of the samples. Segregating structural and nonstructural samples, it is apparent that there is much less variation in the latter. Utility wares in most of the nonstructural samples are dominated by graywares (most are at least 90 percent grayware). Structural and nonstructural samples are similarly patterned with respect to the proportions of other wares as well as bowls and jars.

Comparing the Pueblo I-II project samples with the ceramics from the early Pueblo II components at Cerro Colorado, the Pueblo I-II sites recorded in the Hubbell Ranch area (Eck 1982; Elyea 1983; Hogan 1983), Site 188 (McGimsey 1980:259-265), and the Williams site, all contain similar pottery types. The relative gray/brown ware proportions are quite variable among all of these sites, as are those calculated using the project samples. Utility ceramics at the Williams site and the Mariana Mesa site are dominated by brownwares while graywares outnumber brownwares at the remaining sites. While this variation in gray/brown proportions may be characteristic of these Pueblo I-II assemblages in and around the project area, the reasons for differences among sites are unknown.

Pueblo II sites provide the largest group of samples (134) from the SACA project. These samples include those with Basketmaker III and Pueblo I-III components, in addition to the single component Pueblo II sites and proveniences. Only the samples from locations identified as single Pueblo II components (52) are discussed below. By definition, sherds of Red Mesa Black-on-white and earlier decorated types are scarce in the samples; Reserve Black-on-white, Reserve/Tularosa Black-on-white are the principal decorated wares. Puerco Black-on-white, Escavada

Black-on-white, Socorro Black-on-white, and Gallup Black-on-white comprise a small percentage in these site assemblages. Indented Corrugated Gray is by far the most common utility wares, with Plain Gray, Indented Corrugated Brown, and Polished Brown occurring in lesser amounts. Redwares are present in very small quantities. Decorated wares are more numerous than utility wares in just over half of the samples and jars are the most common vessel form in almost all of the samples.

The gray/brown ware proportions do not appear as variable here as they are for samples in the Pueblo I-II category. This period does include samples in which brownwares are predominant and those in which graywares are predominant. It is more common, however, for utility wares to be dominated by graywares, thus the gray/brown ware proportions average 75/25 percent.

The Pueblo II site assemblages from project sites generally compare with other Pueblo II sites recorded in the region. The ceramic assemblages at Pueblo II sites recorded by Eck (1982), Elyea (1983), Hogan (1983), and Moore and others (1983), have slightly higher proportions of graywares. There is a higher proportion of the utility wares at Site 601 (McGimsey 1980:249-256), but that is difficult to determine from descriptions of excavated ceramics which pottery types make up the utility ware assemblage.

Decorated wares in Pueblo II-III ceramic samples are dominated by several types: Tularosa Black-on-white, Reserve Black-on-white, and Reserve/Tularosa Black-on-white, and the redware bichromes which average almost 24 percent of the total number of sherds in all Pueblo II-III period samples. Gray and brown indented corrugated are the dominant types of utility wares. As in the Pueblo II period, there is a slightly greater number of sherds in the decorated than in the utility ware category. The gray/brown ware proportions are even more variable than they are in the Pueblo I-II samples. Jar sherds outnumber bowl sherds in most samples.

The ceramics recorded at other Pueblo II-III sites in the region present a very similar pattern. Pottery types present on the sites are generally analogous to those in Pueblo II samples, and the gray/brown ware proportions in samples reflect a similar pattern of variability. Site 481 (McGimsey 1980:249-256) has only seven percent graywares in the assemblage. In the Hubbell Ranch area, Pueblo II-III sites are variable, but contain an approximate 50/50 percent proportion of gray and brown wares. The Pueblo II-III sites excavated near St. Johns, Arizona (Crown 1981) average 77/33 percent gray/brown wares.

Tularosa Black-on-white is the main type of decorated whiteware in Pueblo III samples, which also contain small amounts of other types including Reserve Black-on-white and Reserve/Tularosa Black-on-white. St. Johns Black-on-red and St. Johns Polychrome are the second most common types of decorated ware. The redwares as a whole comprise an average of almost 25 percent in Pueblo III samples and an average of 42 percent of the decorated wares. Gray and brown indented corrugated types are the dominant utility ware sherds. In almost two-thirds of the Pueblo III samples, decorated wares outnumber utility wares, and graywares are slightly more numerous than brownwares.

The Sandstone Hill Pueblo and two Upper Gila Expedition sites UG143 and UG616 are the only Pueblo III sites recorded in the area. All are composed of masonry roomblocks and associated features. The ceramic type inventory on these sites is very similar to that of the project sites, including Tularosa Black-on-white and St. Johns Black-on-red and St. Johns Polychrome as major types. In all three of the ceramic inventories at these sites, brownwares average 89 to 96 percent of the utility wares. This pattern would indicate that brownwares dominated utility ware assemblages during the Pueblo III period; however, project sites suggest a different conclusion. The gray/brown proportions in Pueblo III period samples from roomblocks range between 100/0 and 0/100 percent. Samples on the whole average slightly more graywares than brownwares. Comparing Pueblo III-late Pueblo III period samples to the previously excavated site assemblages, the variability among project samples provides a similar contrast. The type content and the relative proportions of different wares in

Pueblo III-late Pueblo III samples are very similar to those of Pueblo III period sites. Klageto Black-on-white and Springerville Polychrome are the only later types not present in the Pueblo III samples.

In conclusion, the decorated ware/utility ware proportions are not distinctively patterned for any one period. The general pattern, however, is that assemblages are dominated by decorated wares in Pueblo I-II times and in Pueblo III and late Pueblo III periods, while utility wares form the majority of sherds in assemblages during Pueblo II times. Redwares become increasingly more common through time and account for nearly half of the decorated wares in Pueblo III samples. Jar sherds represent the most common vessel form throughout the prehistoric occupation of the region, although bowl sherds become somewhat more abundant through time. The increasing number in samples of White Mountain Redwares is linked with the above trend since redware vessels are primarily bowls.

The gray/brown ware proportions in samples reveal some interesting trends. While some of the previous researchers suggested a fairly consistent pattern (brownwares dominant in Basketmaker III, early Pueblo I and Pueblo III sites, and graywares dominant in Pueblo II sites), the ceramic sample data do not support such patterning for ceramic assemblages in the survey area. The earliest periods are not well represented by the ceramic samples. Utility ware proportions in the few samples obtained are highly variable data. In the Pueblo I-II and Pueblo II periods, although samples vary considerably, many samples do contain higher proportions of graywares. However, variability in gray/brown ware proportions among samples appears to increase from Pueblo II-III times on, irrespective of the types of features or structures at sites. The average gray/brown ware proportions during each period indicate that graywares comprise the majority in utility ware assemblages in most samples. The sites at which brownwares are in the majority occur in all periods and at this point in the analysis of Quemado area assemblages do not appear to vary radically (with respect to other types of remains) from those at which grayware sherds are in the majority.

Conclusion

The analysis of SACA ceramic data presented in this chapter has focused on the ceramic assemblage content of temporal periods. Analytical findings are summarized below along with suggestions for future studies in the region. Finally, the use of ceramic typologies in this portion of west-central New Mexico is briefly reviewed.

Basketmaker II and early Pueblo I occupations in the project area were found to be quite rare. Consistent with previous documentation of early sites in this region, assemblages dominated either by Anasazi or Mogollon decorated wares were recorded in the SACA. The few ceramic assemblages sampled vary considerably among sites in the relative proportions of gray and brown wares and of decorated types present. This variability may be characteristic of early occupations which were intensively reused for residential and other functions. It may also substantiate the fact that too few documented assemblages exist for analytical comparison.

Future studies of early ceramic period assemblages should focus on the degree of reuse of locations in order to ascertain whether segregation and sampling of single occupations are possible. A substantial number of late Pueblo I-II sites (47) were sampled in the project area. Sites representing late Pueblo I-II period occupations are in fact the most numerous in the quadrat sample (Table. 4.4) comprising 24 percent of the recorded proveniences.

Late Pueblo I-II period samples generally contain similar pottery types; however, the relative proportions of wares, especially of utility wares, vary considerably among samples. Decorated assemblages are composed almost exclusively of Red Mesa Black-on-white and Reserve Black-on-white sherds. Utility wares include plain, neckbanded, and clapboard gray and brown sherds with proportions of utility and decorated wares probably dependent to a great extent on functional site class. Ceramic samples from structural sites of this time contain utility ware assemblages dominated by gray and brown wares, contrast-

ing with nonstructural sites of which more contain higher proportions of grayware. While specific local conditions, such as clay and temper availability, may result in variable gray/brown ware proportions at sites in the project area, these factors have yet to be investigated. Explaining the above patterns requires specific studies done in conjunction with documentation of the range of ceramic types present in a larger sample of Pueblo I-II assemblages.

The largest group of samples (52) comes from Pueblo II period sites. In the quadrat sample 15 percent of the proveniences recorded represent this period. Reserve Black-on-white is the most abundant decorated type and indented corrugated gray and brown types are the most common utility wares. Proportions of gray and brown wares do not appear to vary with functional site classes of this period.

Although ware proportions do vary somewhat among sites, the variability exhibited by Pueblo II period samples appears to be less than that exhibited by samples from earlier and later periods. This pattern may be tied to the large number of cases examined. If, in addition, it results from similar occupational histories of Pueblo II sites, this pattern would be well worth pursuing in future studies.

Reserve Black-on-white, Reserve/Tularosa Black-on-white and Tularosa Black-on-white make up the whitewares in Pueblo II-III period ceramic samples. Almost equal numbers of Pueblo II-III and Pueblo II period proveniences were recorded in the quadrat sample (35 and 37, respectively), although proportionally fewer Pueblo II-III assemblages (32) were sampled for ceramic content. In contrast to earlier periods, redwares (mostly White Mountain Redware Bichromes) make up an appreciable percentage of sherds in these samples. Variability in the proportions of gray and brown wares among Pueblo II-III samples is greater than that exhibited by samples from any other period. This pattern may be the result of longer term and more intensive reuse of locations as suggested by the presence of pottery types indicative of Pueblo II and Pueblo III period occupations, and as such may be an important indicator of composite site assemblages.

Tularosa Black-on-white is the most abundant decorated ware in Pueblo III and Pueblo III-late Pueblo III period ceramic samples; St. Johns Polychrome and Black-on-red the next most common types. Gray and brown indented corrugated wares are the predominant utility wares, and while their proportions are quite variable among individual samples, several patterns have been noted. First, of the Pueblo III sites and provenience samples, half of each have assemblages dominated either by gray or by brown utility wares (Figure 5.16). Second, of the three Pueblo III-late Pueblo III sites sampled, one (Site 330) yielded roomblock and midden assemblages dominated by corrugated brownwares; corrugated graywares dominated in assemblages at the other two sites.

Klageto Black-on-white and Springerville Polychrome are the two decorated wares that distinguish the late Pueblo III period occupations; these types appear to be the latest prehistoric materials recorded in the project area. Sites investigated by others in the region contain assemblages of pottery types very similar to those listed for late period sites in this study.

The set of late samples examined here are few in number and include ceramic assemblages from outside the six percent quadrat sample. Nonetheless, one conclusion in contrast with previously noted patterns of ceramic content is worth noting and involves the amount of variation in the relative proportions of gray and brown wares among sites in the project area. Specifically, (1) a high degree of variability in the relative contributions of gray and brown ware to utility ware assemblages seems to characterize all time periods and (2) brownwares predominate in utility ware assemblages at some but not at all of the later sites in the project area. This pattern contrasts with the claim by previous researchers of consistently higher proportions of brownwares at later sites in the Quemado area.

The area has long been considered a transitional zone between the Mogollon region in the mountains to the south and the Anasazi plateau region to the north. The co-occurrence of gray and brown utility wares at sites and the similarity between northern Mogollon and southern Anasazi whiteware types and ceramic series have been viewed as indicators

of the existence of a transitional zone that in itself is evidence of some sort of interrelationship between the two areas. Understanding this interrelationship, or determining whether the co-occurrence of gray and brown wares does, in fact, indicate significant relationships between Mogollon and Anasazi prehistoric groups, has been identified as a major research issue for this region (Stuart and Gauthier 1980:167).

While this issue has not been directly addressed by this study, the identification and description of ceramic assemblages presented here have defined patterns of ceramic assemblage content through time and among site types in an effort to contribute toward study of the manufacture and use of gray and brown wares and their differential use within the Quemado region. The pattern of variability in the use of both wares through all time periods, if pursued, may provide the critical clues to understanding the determinants for the exclusive use of gray or brown wares in separate regions.

As a final comment, the use of standard ceramic typological systems within the project area can be addressed. Almost all researchers who have worked in the Quemado region and surrounding areas have encountered difficulties in use of standardized typologies. Problems result in part from ambiguous type definitions, lack of securely dated contexts for ceramic types, and from the fact that some pottery types exhibit technological and stylistic attributes assignable to separate archeological cultures.

The identification by this project of a Pueblo I pottery type, Cheap Johns Black-on-white, suggests that at least some of the early locally made decorated wares may exhibit a combination of Mogollon and Anasazi technological and stylistic attributes. During the course of the SACA project, this phenomenon was noted at other sites in the region and additional fieldwork may identify a group of Mogollon/Anasazi transitional wares. Further, type criteria do not always readily distinguish between Red Mesa Black-on-white, a late Pueblo I type, and Reserve Black-on-white. Similar problems exist for Reserve and Tularosa Black-on-white types.

The difficulty in distinguishing between Reserve Black-on-white and Tularosa Black-on-white sherds is well documented for the Quemado region. An intermediate category used in this study, Reserve/Tularosa Black-on-white, was created to overcome this problem. Reserve Black-on-white is also stylistically very similar to Puerco, Escavada and Snowflake Black-on-white; however, technological attributes aid in distinguishing these later types. By presenting type definitions and a description of the project assemblage, this study has attempted to at least partially overcome problems stemming from the use of a standardized typological system, while benefiting from its wide applicability throughout the Southwest.

Chapter 6

Lithic Analysis

This chapter describes lithic data from SACA proveniences documented through systematic survey and reconnaissance and discusses the results of the lithic analysis. The site sampling strategies employed during the project are reviewed. The review focuses on confidence in sampling procedures and establishes a framework for presenting the data, based on sample confidence. It assesses the potential of each level of sampling to contribute information about lithics in the project area. Proveniences on which all of the observed lithics were attribute-coded are emphasized in these analyses. Data from proveniences with samples other than all of the observed attribute samples are also summarized. Recommendations for recording and reporting lithics on future projects conclude the chapter.

Chapter 6 includes a brief summary of lithic source data. Only gross categories of source materials, most of which are locally available, were employed during the survey. The proximity of documented quarry locations, the ease in obtaining raw materials from local gravels and lava flows, and the restricted distribution of nonlocal lithics all point to an exceptionally circumscribed, local system of lithic procurement.

Introduction

To date, most analyses of west-central New Mexico lithics consist of lists of items found on sites (e.g. Eck 1982; McGimsey 1980). Interpretation of lithic data from the area is rare and falls into three categories: (1) discussions of whether west-central New Mexico assemblages are part of the Oshara tradition or the Cochise culture (Berman 1979; Elyea 1983); (2) attempts to define aceramic assemblages chronologically by the analysis of debitage (Elyea 1983); and (3) preliminary lithic source studies (Wilson 1978).

West-central New Mexico lies midway between the San Juan Basin and southeastern Arizona. Like other areas that lie between archeologically better known areas, the local lithic technology is likely to be thought of as transitional or intermediate. Most workers agree that it is important to determine whether the San Juan Basin projectile point sequence (Irwin-Williams 1973) or the southeastern Arizona sequence (Sayles and Antevs 1941) is valid for this area. Chapman (1980) and Gossett (1985) have both shown that neither chronology is well-substantiated, despite devoted adherence by many fieldworkers since the chronology's inception. In order to establish projectile point chronologies firmly, radiocarbon dates from well-controlled contexts of association are needed. Even with firm dates, analytical conclusions may be ambiguous because of (1) the multiple occupation and reoccupation of sites, (2) the widely recognized prehistoric practice of scavenging earlier projectile points, and (3) the fact that the meaning of formal variability in projectile points is unclear. Projectile points from the San Augustine Coal Area are illustrated and described in this report, but the lack of independent dating methods precludes the confirmation of existing chronologies or the establishment of new ones.

A related problem is the chronological placement of aceramic assemblages. Recently Southwestern archeologists have differentiated Archaic and Anasazi assemblages by

means of attributes such as material type, the amount of cortex on flaking debris, and the proportion of bifaces to flake tools and debris (Hogan and Winter 1984; Kemrer and Kemrer 1979; Phagan 1982; Vierra 1981). The meanings different researchers attach to "diagnostic" characteristics are often in total disagreement (Stiger 1983). Nevertheless, the identification of chronologically diagnostic assemblage types allows archeologists to place these problematic lithic scatters in a broad temporal framework that facilitates settlement pattern studies. The analyses presented below are not based on chronological differences between assemblages and, therefore, do not deal with this question.

Rather than concentrating on the above problem areas in lithic analysis, this study emphasizes the measurement of inter-assemblage and intra-assemblage variability, i.e. the comparison of assemblages among sites and among areas of the same site. Until recently, Southwestern lithic analyses have been so slanted toward classifying temporally diagnostic artifacts that many aspects of assemblages have been completely ignored. As with some of the chronological studies of assemblages cited above, the emphasis here is on the examination of relationships among parts of assemblages, initially by constructing plots or histograms based on assemblage content. This approach is essentially descriptive. It consists of a search for patterns in assemblage content rather than in spatial structure, except on large pueblos where gross spatial distinctions were made on the basis of architectural units. The causes of assemblage variability are not addressed. They may be rooted in 1) the adaptations of particular technological strategies, commonly viewed as the result of chronology or culture; 2) the occupational history of places, which may reflect changes in their overall function as well as in the function of activity areas; 3) the use of a particular survey methodology; and 4) post-depositional natural and cultural processes, for example, the tendency of large objects to "float" to the surface (Ammerman and Feldman 1978; Baker 1978) or the intensity of artifact collecting in an area. Until the degree to which assemblages are different is known, the causes of assemblage variability remain difficult to diagnose.

Methodology

Sampling: Considerations and Problems

The importance of explicit, informed sampling procedures to the analysis of lithic assemblages cannot be overstated. On archeological projects that deal only with surface artifact distributions, recovery of the entire assemblage is prevented by biases introduced through such factors as crew comfort and experience, ground visibility, and post-depositional processes (e.g. differential burial or deflation). We are left with an uncontrolled sample of an unknown assemblage. Current efforts to recognize, understand and eventually control for these biases are promising (see Cannon 1983; O'Brien et al. 1982; Schiffer 1976, 1983; Wandsnider 1983; Wandsnider and Ebert 1984). Even if many sources of bias remain uncontrolled, we can minimize additional bias by choosing well-founded data recording procedures, i.e. by employing systematic discovery methods and avoiding non-representative artifact sampling.

The discovery and recording methodology employed on this project and on almost all other cultural resource management projects imposes a structure on data recording that influences how the data are perceived. This structure limits the possibilities of data analysis in many ways. Three important limitations that will be discussed below are (1) the division of the cultural landscape into "sites" and "isolated finds"; (2) the emphasis on assemblage content data at the expense of spatial structure data; and (3) the emphasis on the amount of acreage surveyed at the expense of the quality of data collected. These problems plague archeological surveys as they are routinely conducted everywhere (Plog et al. 1978; Schiffer et al. 1978) and are not specific to the San Augustine Coal Area survey.

Division of the landscape into "sites" and "isolated finds" is an arbitrary practice that fails to deal with the reality of multiple occupation and reoccupation of landscapes for durations much shorter than current ceramic chronologies can document. Most archeologists view "sites" and "isolated finds" as

if they somehow directly reflect single episodes of human behavior, a view that is incompatible not only with how people have used the landscape but also with natural changes in the landscape since prehistoric occupation. Dunnell and Dancey (1983) and Ebert (1983) have defined the major conceptual problems with a site-oriented approach to archeological survey (see also Ebert et al. 1983a, 1984; Wandsnider and Larralde 1984). A striking example of the problems caused by the use of inappropriate units of observation is "site" 270 from this project, which has 22 arbitrarily defined proveniences. The reason for this proliferation of proveniences (and the reason that the site boundaries conveniently end at the survey unit borders) is that there is no "site" nor are there "proveniences" at 270. Rather, there is a dense artifact, feature, and structure scatter covering two adjacent sample units and beyond, with no defensible evidence for dividing it into units of single episode occupation.

The second limitation is that standard survey methodology employs "sites" and "proveniences" as major units of observation, but these units often lack consistent definition. Consequently, spatial analysis cannot be conducted at a scale finer than the "site" or "provenience" level; it is biased by the fact that the units have been neither well-defined nor consistently applied. Analysis is limited to assemblage content. The spatial structure of artifact distributions can be examined in terms of the content of site and provenience areas versus other site and provenience areas (in square meters), but even at this relatively gross scale of analysis, the quality of results suffers because of the inconsistent definition of the units of observation.

Third, the emphasis on covering acreage has a detrimental equalizing effect on artifact recording procedures for very large sites and very small sites at the expense of data quality and sample comparability at both ends of the size spectrum. Small sites suffer because of the pressure to limit search time, therefore to relegate single items or small scatters to isolated occurrence status or dismiss them entirely as "noise" from larger sites nearby. Large sites suffer because time constraints rarely permit the thorough recording of the hundreds or thousands of artifacts found on them.

Sampling such sites becomes a necessity, but in the absence of samples of all-observed items from large sites and of an understanding of large-site spatial structure, the meaning of the samples is unclear. This major problem was not solved on the San Augustine Coal Area survey and it is probably unresolvable with traditional survey methods.

A hierarchical sampling strategy was devised on the SACA survey for dealing with these problems, i.e. sample comparability and information content decreases as site size increases. As a result, all-observed samples are poorly represented for some site types, mainly large architectural sites surrounded by dense scatters, while other site types (small scatters) are well represented. It is important that future projects rectify this gap in information by conducting intensive artifact analyses on as many sites as feasible in the poorly sampled site type categories.

Sample Types and Sample Confidence

Field methods for lithic data collection are detailed in Appendix 4. This summary includes a description of the data format, examples of forms used on the project, a glossary of attribute definitions, and a discussion of in-field sampling procedures, training, and coding error.

Three major sample types were defined for the San Augustine Coal Area survey and are discussed below in order of sample reliability from least to most reliable.

Narrative Samples

This type includes sites with (1) narrative-only samples (i.e. a qualitative description of the lithic assemblage with no quantification); (2) tools-only samples; (3) quadrat samples; and (4) all-observed tallies.

> 1. **Narrative-only** data are based on qualitative impressions of reduction sequences and material types and on estimates of numbers of tools and debitage present, gained from walking over the site. These sites or proveniences are generally so large and amorphous that other sampling procedures

were not feasible, or circumstances at the time the provenience was recorded prevented other kinds of sampling. An example is the enormous quarry at Site 258 that takes in a band of conglomerate gravels below a mesa rim and covers an area of approximately 360,000 square meters.

2. **The tools-only** sample consists of all formal and informal tools located on a site's surface. Tools-only sample reliability is compromised in the following ways: (a) occasionally tools were located by conducting systematic narrow sweeps over a site, but this was not regularly done. There was no systematic discovery procedure for finding tools; (b) When all lithics are not examined (and sometimes even when they are), informal tools (i.e. retouched or utilized flakes) are likely to be underrepresented in a sample because they are more difficult to recognize than formal tools, and because all edges of an item must be checked in order to recognize them. Formal tools in the early stages of manufacture are subject to the same problems; (c) The size of the item is likely to be directly proportional to its chance of being discovered. The tools-only assemblages (and probably all the assemblages) are biased towards groundstone and hammerstones and against small chipped stone tools. Counts of small items in these samples are likely to be too conservative.

3. **Quadrat** sample data primarily provide presence/absence information about assemblage content. One must assume that sites lack spatial structure (cf. McAnany et al. 1984) to extrapolate from the sample to the entire site. Quadrat sampling is an intensive look at a small part of a site, with no way of knowing how the part is related to the remainder.

4. **All-observed tally** refers to sites where every item located was examined, but only two attributes were recorded: artifact type and material. The data are useful for density calculations and assemblage content summaries but lack attribute information that is needed for other kinds of analyses. Again, informal tools are likely to be missed.

All-observed Attribute Samples

The highest quality data base for lithics consists of proveniences at which all of the observed lithic artifacts were coded. This data base and the all-observed tally are the only samples for which assemblages are comparable because all surface lithics were recorded. Comparability is a problem even for the all-observed proveniences because the search for items to flag was not conducted systematically and search intensity varied from site to site (Ebert et al. 1983a). We are presently unable to measure the amount of bias introduced by these methodological inconsistencies. Compared with narrative samples, search time is likely to have been longer for the all-observed samples.

An advantage of the all-observed attribute samples is that the identification of reduction stage can be independently supported by several attributes, including size, cortex, dorsal scar count, and platform type. Other attributes document item completeness, use, and breakage.

Problems in Sample Comparability

A variety of sampling procedures was employed during the project as a solution to the time constraints presented by large, dense sites and the need to incorporate lithic data from sites recorded during the reconnaissance stages of the survey. The resulting sample types are not equally reliable, and the degree of comparability of site assemblages other than those in the all-observed category is difficult to assess. The two important problems in sample comparability are (1) the wide range in the way high artifact density sites were sampled, and (2) the limited usefulness of sample data in general. An assumption made here is that artifact distributions at sites have a spatial structure, i.e. different areas of a site are used for different purposes during one or several occupations, and these differences are reflected in the content and density of surface assemblages (cf. Lewarch and O'Brien 1982);

therefore a sample from a small area of a site is not likely to be representative of the entire assemblage. This basic assumption challenges the practice of extrapolating from samples to entire assemblages. Similar sampling problems are acute for most surface archeological projects. It is, consequently, highly desirable to collect systematic all-observed data from as many sites as possible so that the data are methodologically comparable and so that assumptions about the surface spatial structure of artifact distributions at sites can be confirmed or rejected.

Because the following analyses concentrate almost exclusively on the all-observed sample, it is important to explore the relationship between the all-observed sample and the other lithic samples and also the extent to which the sampled proveniences are representative of all the proveniences. Table 6.1 is a comparison of sample types (all-observed/other types/unsampled) by provenience type. Because the criteria for defining proveniences were not consistent, all proveniences with architecture are grouped together. Architectural proveniences include small structures, roomblocks, middens, and pitstructures. Scatters are broken down by the presence or absence of features. The unsampled proveniences include those without lithic artifacts. Also, proveniences may not have been sampled because others at the same site were sampled.

This comparison of sample types indicates a strong bias in all-observed sampling towards scatters, regardless of area. The bias is based on artifact density, which is often too high on architectural proveniences for all-observed samples to be feasible, given the time constraints of standard CRM field methodology.

Lithic Raw Materials

Lithic Resources in the Project Area

The most complete description of lithic material types that occur in and near the San Augustine Coal Area was compiled by Wilson (1978). He elaborates on Warren's (1971) list of material types found in Catron County. These material types include varieties of chert, chalcedony, basalt, rhyolite, other crystalline volcanics, petrified wood, and quartzite. Although the distribution of common material types has not been plotted within the project boundaries, all occur as chunks or cobbles in conglomerate formations and on alluvial terraces, and all are readily available within the 40 km radius enclosed by the project.

Known Quarry Locations in or Near the Project Area

The Laboratory of Anthropology ARMS file was searched for quarry locations recorded over an extensive area that includes the project area and stretches north to Zuni, east to include the Northern Plains area, west to the New Mexico-Arizona border, and south to Highway 160. Results were minimal, probably because quarries are often not recorded, very little CRM work has been done in the area, and local raw material deposits in the form of cobble gravels, petrified logs, and basalt caprock are abundant in the area. Three basalt quarries at outcrops were recorded during the Quemado Class II survey (USDI, BLM 1979). Other Class II survey sites, in T. 1S., R. 18W., Section 17 are listed on the ARMS output as quarries are early stage basalt reduction sites.

Table 6.1: Sample Type by Provenience Type

Provenience Type		Sample Type		
	N	All Observed	Other	Unsampled
Architectural	170	25 (14.7%)	82 (48.2%)	63 (37.1%)
Scatters	180	85 (47.2%)	51 (28.3%)	44 (24.4%)
w/features	119	43	36	40
w/o features	61	42	15	4
Other	9	3*	2	4
TOTAL	**359**	**113**	**135**	**111**

*not included in all-observed attribute analysis.

One geologically-defined gravel deposit covering several hundred thousand square meters was recorded during the San Augustine Coal Area survey.

A second extensive deposit encompassing over 400 cubic yards of gravel (DCA-83-302) was recorded by the Division of Conservation Archeology (Moore et al. 1983). These quarries consist of cobble deposits of quartzites, crystalline volcanics, and cherts.

The gray chert that Elyea (1983) refers to as coming from a local, noncobble source was not recognized during the survey, and no outcrops of this material were found.

Known Quarry Locations for Nonlocal Lithic Materials

Three exotic, or nonlocal, lithic materials were recognized during the San Augustine Coal Area survey: obsidian, brown-spotted chert, and Zuni wood. Brown-spotted chert (sometimes referred to as Chinle chert) is a lustrous dark orange jasper-like chert with dendritic black inclusions. Zuni wood is a distinctive lustrous chert ranging in color from dark pink to purple. All three materials are rare on project sites, although some obsidian may be local. The Red Hill volcanic plug, an obsidian source documented by Wilson (1978:28), is on the south boundary of the project area.

Brown-spotted chert outcrops have been observed west of Zuni (C. Cameron, personal communication 1984), but no specific raw material procurement sites have been recorded for this material or for Zuni wood. Brown-spotted chert is commonly found as cobbles in arroyos throughout the Zuni area (R. Anyon, personal communication 1984). Zuni wood occurs in the Butte Mountain member of the Petrified Forest formation, and a source near Zuni is postulated (H. Warren, personal communication 1984).

Without more accurate sourcing information, little can be said about mobility, trade, or other forms of interaction except that the above nonlocal materials are found in the Zuni area and had to be procured through one of these means. Their rarity in the Quemado area assemblages (maximum occurrence for brown-spotted chert is six pieces on one site) suggests that they were not the basic commodities for stone tool manufacture. Elyea (1983:28) observed that brown-spotted chert was most often found on Pueblo II-III and Pueblo III period sites, and that this material type was absent from Archaic assemblages. It is unknown whether this trend is confirmed by the current project data.

Brown-spotted chert frequently occurs as tools or tool fragments (16.6 percent of 33 pieces) and heat spalls (11.1 percent); Zuni wood often occurs as utilized flakes (13.3 percent of 23 pieces). Also noteworthy is the mutually exclusive distribution of the two nonlocal materials, which occur together at only two sites of the 28 on which they were found.

Obsidian accounts for 1.1 percent of lithic materials in the all-observed coded samples. If Red Hill was a prehistoric obsidian source, the distance fall-off models (e.g. Renfrew et al. 1968; Sidrys 1977) for correlations between proximity of source material and frequency in assemblages fail to explain the rarity of this material type in local assemblages.

Perhaps the quality of Red Hill obsidian is so poor that it was rarely sought, or perhaps nearly all lithic tool needs could be better satisfied by materials that were closer at hand. In any case, the presence of an obsidian source in the project area seems to have had little effect on the proportion of obsidian in local lithic assemblages.

Summary

Two conclusions of interest can be drawn from lithic source locations: (1) lithics that account for approximately 99 percent of project assemblages can be obtained locally; (2) nonlocal lithics seem to have come predominately from the Zuni area some 50 miles to the north.

This evidence suggests a very sedentary, locally-bounded system of lithic procurement in which neither wide-ranging trade nor special task-oriented mobility (i.e. embedded lithic procurement strategies) has introduced a substantial quantity of lithic material of nonlocal origin.

Assemblage Variability in the All-Observed Sample

Attributes of all items observed at a provenience were coded for 110 proveniences, and data from 109 proveniences are included in the analyses. This sample includes 2,187 chipped and groundstone items. Assemblage size for any one provenience ranges from one to 132 items, with a mean size of 19 items; the mean number of tools in each assemblage is four.

Provenience Types

The first step in looking for patterning in assemblage content was to define the characteristics of the proveniences. The size distribution of proveniences was examined by plotting provenience area in square meters, resulting in a tri-modal distribution. Figure 6.1 demonstrates the basis for provenience size definitions: small is 0 to 65 m2; medium is 85 to 650 m2; and large refers to 800 to 12,000 m2. This pattern and the distribution of structures and features within proveniences are the bases for the following provenience type definitions.

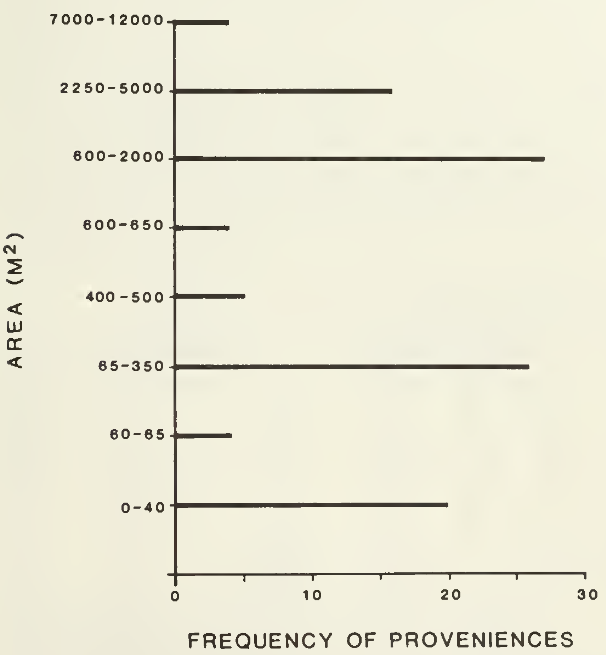


Figure 6.1: Provenience area distribution.

Nonstructural Samples

1. Small scatters are nonstructural proveniences, with or without features and with an area of 65 square meters or less.

2. Scatters are 85 to 650 square meters in area and have no features. Ceramics are usually, but not always, present.

3. Scatters with features fall in the same size range as the above category; however, hearths, firecracked rock, or ash stains are present.

4. Large scatters are 800 to 12,000 square meters in area.

5. Large scatters with features fall in the "large" size range and include hearths, firecracked rock, or ash stains.

Structural Samples

1. Small structures are those proveniences with one to four rooms, surrounded by refuse scatters but with no apparent dumps or middens. Three proveniences with a higher room count, but no associated middens, were also placed in this category.

2. Roomblocks are proveniences with five or more rooms; items in this category occur on or immediately surrounding the roomblock.

3. Middens are proveniences where surface density of ceramic and lithic artifacts indicates repeated dumping of trash. They occur only on architectural sites and are associated with roomblocks.

4. Pitstructures are defined by roughly circular depressions or roughly circular areas with high concentrations of burned jacal, stained soil, and artifacts.

The provenience definitions are not based on the frequency of artifacts in assemblages. The most significant aspect of the list of proveniences in each category (Appendix 5) is the wide range in artifact frequency within each provenience type (Table 6.2), e.g. many proveniences have fewer than 10 items. For this reason, assemblages are grouped by provenience types in the following analyses so that frequencies will be large enough to com-

pare. Even when grouped, some provenience types (notably pitstructures, middens, and roomblocks) have a low frequency of lithic items and are poorly represented.

In addition, no conclusions were formulated as to the meaning of the provenience types in advance of the analysis. Designation of the provenience types is based solely on field description, not on inferred function. It is clear, however, that defining provenience types prior to the analysis influences the results. Data from the all-observed proveniences are categorized by the above provenience types (Appendix 5) and are also presented in numerical order by provenience number (Appendix 6).

Assemblage Variability

Variability in reduction stage, material type, tool frequency, tool breakage patterns, and lithic artifact density are considered below.

Lithic Reduction

Recently, lithic analysts have been concerned with defining reduction stages of debitage by size and other attributes, as a means of characterizing site function (Jeffries 1982; Magne 1983; Pokotylo 1978; Raab et al. 1979). Since lithic tool manufacture is reductive, i.e. it consists of removing flakes from a core or blank to make a tool, the manufacturing stages can be inferred from characteristics of the debris. Researchers may be able to infer from reduction stage data whether early or later stages of tool manufacture occurred at a place, or whether tools were used or resharpened but not manufactured there. With the exception of Magne's work (1983), these studies have emphasized biface reduction. However, debitage may result from a wide range of lithic production and maintenance activities that include but are not limited to biface reduction. Furthermore, the effect of material type on debitage attributes has not been well controlled and is not well understood. Preliminary studies of whole flakes (Raab et al. 1979; Stahle and Dunn 1982; Stiles et al. 1974) indicate, nonetheless, that early reduction stages are characterized by a large range in flake size, amount of cortex, and dorsal scar count, while later stages are characterized by uniformity in these attributes. A mix of reduction stages resulting from several occupations of the same place might appear to be an early sequence, given these assumptions. Following analyses emphasize the measurement of the degree of variability in flake size, amount of cortex, and dorsal scar count. The analyses presume that differences in the range of these attributes are archeologically significant, but do not directly reflect behavioral episodes. Variability in reduction stage may instead reflect differences or redundancy in the use of a place over time.

➡ Flake size:

The flintknapper starts with a large piece of raw material from which he strikes flakes that either will become tools themselves or that must be removed in order to shape the large piece itself into a tool. Both large and small pieces of debris result from this process. As the flintknapper shapes and finishes the tool, it becomes smaller and so does the associated debris; therefore, a wide range in flake size is inferred to indicate early reduction stages and

Table 6.2: Assemblage Frequencies and Proportions by Provenience Type

		Whole Flakes			Chipped Stone			Groundstone			
Provenience Type	N	X	No.	%	X	No.	%	X	No.	%	Total
Small Scatters	20	4.6	92	36.5	11.3	225	89.3	1.4	27	10.7	252
Scatters	12	3.8	46	37.9	7.8	94	91.3	0.8	9	8.7	103
Scatters w/Features	9	13.9	125	37.8	35.3	318	96.4	1.3	12	3.6	330
Large Scatters	20	5.3	105	32.1	15.2	304	93.0	1.2	23	7.0	327
Large Scatters w/Features	17	9.5	161	36.3	23.3	396	89.2	2.8	48	10.8	444
Small Structures	16	6.1	98	30.2	17.1	274	84.3	3.2	51	15.7	325
Roomblocks	6	6.5	42	41.9	15.2	91	97.9	0.3	2	2.2	93
Middens		7.2	36	26.9	23.4	117	87.3	3.4	17	12.7	134
Pitstructures	4	7.5	30	44.7	19.3	77	89.5	2.3	9	10.5	86
Isolated Occurrences	93		20	24.1		83	89.2		10	10.8	93
TOTAL			**755**			**1,979**				**208**	**2,187**

a narrow range to indicate late reduction stages. If many items are made at the same location, variability in the size of debris may indicate overall trends of lithic manufacture there, i.e. whether the place was a locus of early or late reduction stage manufacture or encompassed all reduction stages.

Flake size data collected during the San Augustine Coal Area include length and thickness in millimeters for whole flakes and proximal (platform-bearing) flake fragments.

The length-to-thickness ratio was calculated from these data. A high length-to-thickness ratio indicates long, thin flakes; a low ratio indicates short, thick flakes. The length-to-thickness ratio may indicate different manufacturing strategies, for example, blade versus biface production. It may also indicate varying levels of skill in flintknapping, with skilled knappers consistently producing long thin flakes and beginners producing short thick flakes. Variability in fracture characteristics of local raw materials is also likely to be an important factor.

Figures 6.2 and 6.3 show the range in length and thickness means for each provenience type. All the means fall into a narrow range of variation, with an anomalous high mean length and thickness for flakes recovered from pitstructures.

Flakes are uniform in size at middens and roomblocks, while scatters and isolates exhibit the widest range in flake size. Flakes from other kinds of scatters and those from small structures fall between these extremes. It is interesting to note that flake size is more variable at small structures than it is at some scatters.

The mean length-to-thickness ratio provides information about the shape of flakes characteristic of each provenience type. Figure 6.4

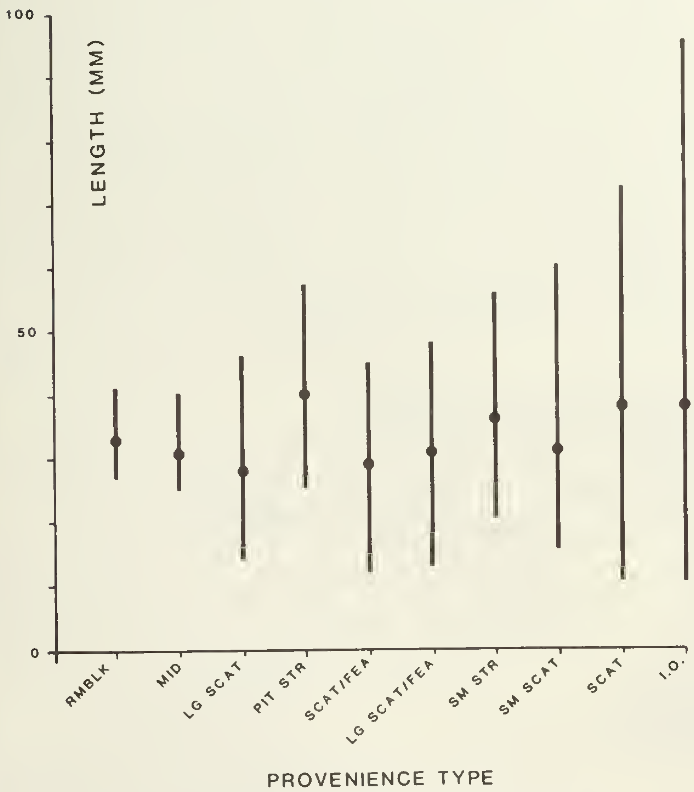


Figure 6.2: Range of mean flake length among provenience types. Black circle represents overall mean per provenience type.

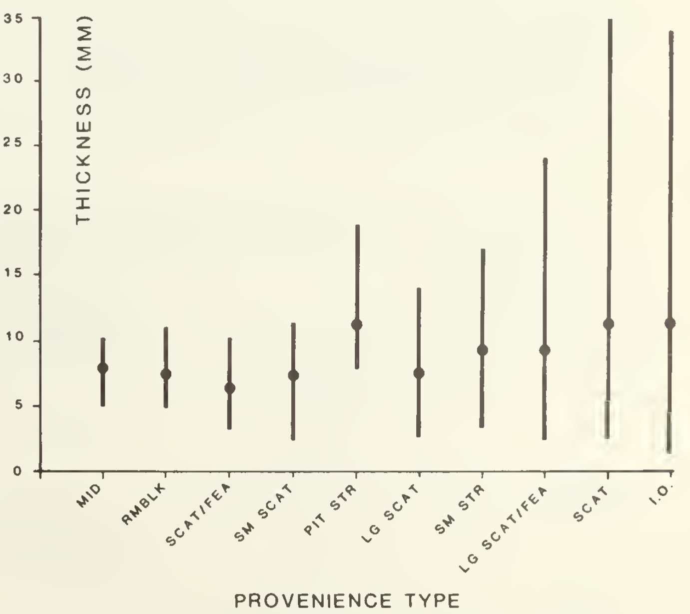


Figure 6.3: Range of mean flake thickness among provenience types. Black circle represents overall mean per provenience type.

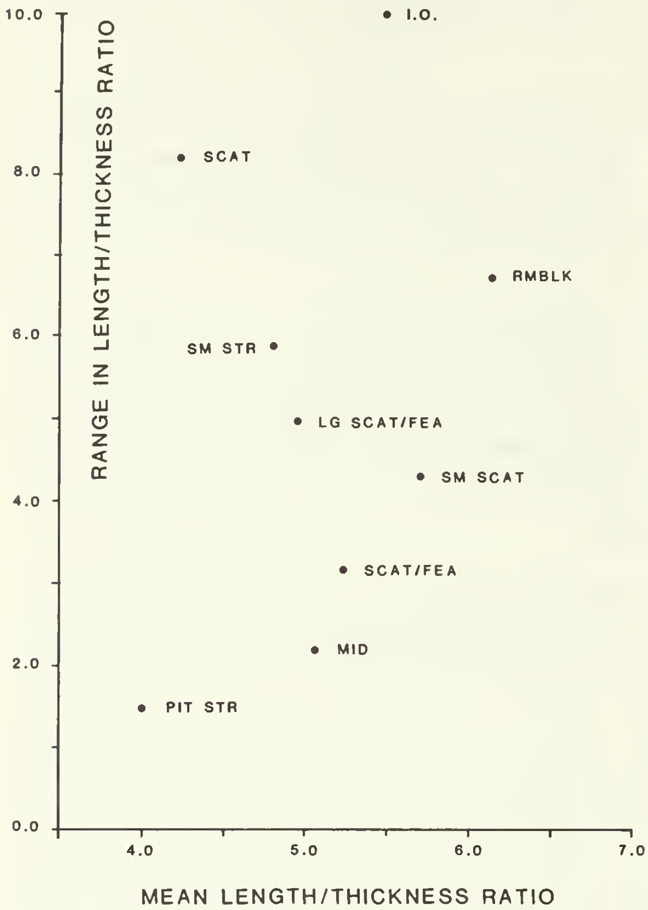


Figure 6.4: Overall mean length-to-thickness ratio versus range of mean length-to-thickness ratios per provenience type.

contrasts the mean flake length-to-thickness ratio with the range in the means for this ratio per provenience type. High values in the range of length-to-thickness means indicate a wide range of flake shape from one provenience to another within each provenience type.

Scatters, for example, may include proveniences with only long, thin flakes as well as proveniences with only short, thick flakes.

Pitstructures, on the other hand, exhibit a low range of means and appear to be characterized uniformly by assemblages of short, thick flakes. Isolates, scatters, and roomblocks have the widest range in length-to-thickness ratios among proveniences, while pitstructures and middens have the narrowest range.

Scatter and pitstructure flakes are alike in their low mean length-to-thickness ratio. In contrast, roomblocks and small scatters have both have ratios above five, indicating the production of long, thin flakes.

Tables 6.3 and 6.4 place the provenience types by flake size variability characteristics. Note that for flake measurements alone, roomblocks and middens exhibit the least variability, while scatters exhibit the most. For the two dimensions of variability in the length-to-thickness ratio (mean and range), pitstructures are least variabile, while roomblocks are most variable.

Table 6.3: Range of Flake Size by Provenience Type.

Length Range	Thickness Range		
	Low	Medium	High
Low	Roomblock Midden	---	---
Medium	Scatters with features	Pitstructures Large scatters Small structures	Large scatters with features
High	Small scatters	---	Scatters

Table 6.4: Range of Flake Length-to-thickness Ratio by Provenience Type.

Range of L-T Ratio	Mean L-T Ratio: Low (<5) (short thick)	Mean L-T Ratio: High (>5) (long thin)
Low (<4.8)	Pitstructures	Small scatters Middens Scatters with features
High (>4.8)	Scatters Small structures Large scatters Large scatters with features	Roomblocks Isolated occurrences

Gross patterns in the flake size data point to a narrow range in flake size for structural sites and a wide range for scatters, although the patterns are not clear-cut. Though the range in the size of flakes from roomblocks is narrow, the range in their shape is wide.

Conversely, pitstructures show a wide range in item size but a greater degree of uniformity in shape. Small structures are far more variable than other structural provenience types in both flake size and flake shape.

The scatter provenience types range from low to high variability in flake size and shape, with scatters showing the most variability.

➡ Cortex cover:

As with flake size, the amount of lithic reduction debris decreases as tools are made. The cortical rind is present on tools in the early stage of manufacture and is trimmed away as the flintknapper finishes the tool; therefore, a high proportion of cortex on flaking debris may represent early reduction stages, while no cortex may indicate late reduction stages.

Noncortical flakes can occur at any stage of manufacture, so that the range in cortex cover within an assemblage is a better indicator of reduction stage than the percentage of cortex present on an item.

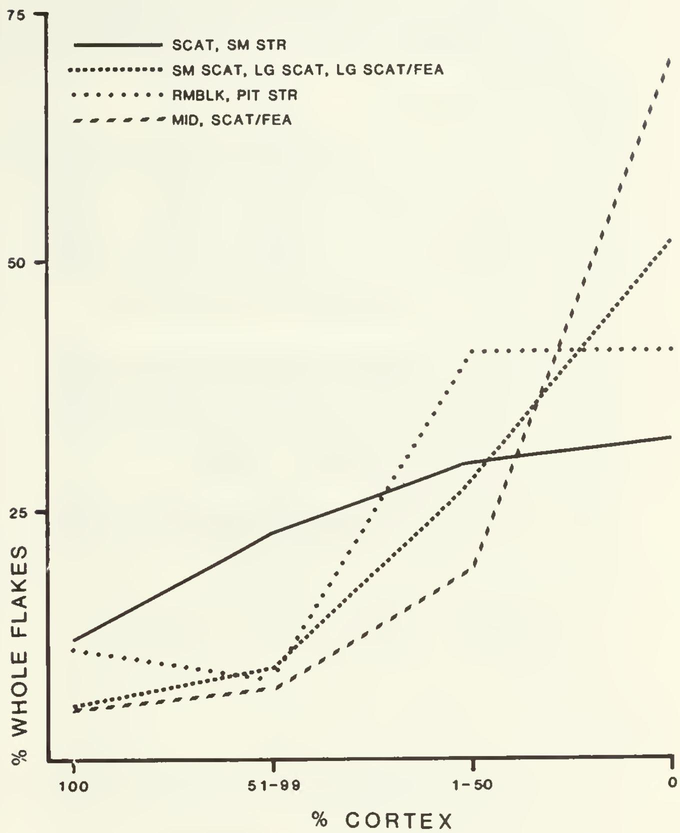


Figure 6.5: Variability in cortex cover of whole flakes among provenience types.

Cortex on the SACA flakes was measured (in percent) on a four-interval scale: 0, 1-50, 51-99, 100.

Figure 6.5 is a noncumulative graph of the cortex cover categories for flakes in each provenience type. Four kinds of proportions appear on the graph:

1. A high frequency of high percent cortex (51-99) flakes — scatters, small structures.

2. A high frequency of medium percent cortex (1-50) flakes — roomblocks, pitstructures.

3. A high frequency of low percent cortex (0) flakes — middens, scatters with features.

4. Intermediate frequencies of all cortex categories — small scatters, large scatters, large scatters with features.

➡ **Dorsal scar count:**

As flake size and cortex cover decrease on flakes in the final stages of tool manufacture, the number of dorsal scars increases. The knapper produces more small scars on tools as he finishes them, and the final trimming flakes have the highest scar count of all.

The dorsal scar count is influenced by flake size. A small trimming flake may only evidence one or two scars, while a larger trimming flake may have nine or more.

Dorsal scar data are plotted on Figure 6.6. Three patterns may be discerned:

1. **High Frequency of 0-1 Scars** — scatters;

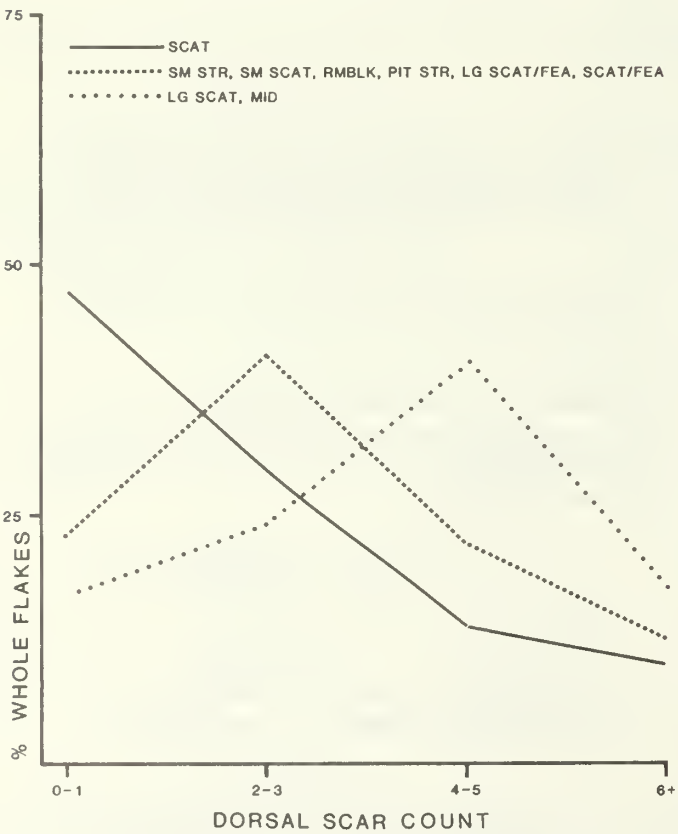


Figure 6.6: Variability in dorsal scars on whole flakes among provenience types.

2. **High Frequency of 2-3 Scars** — small structures, small scatters, roomblocks, pitstructures, large scatters with features, scatters with features;

3. **High Frequency of 4+ Scars** — large scatters, middens.

A high frequency of flakes from roomblocks and pitstructures also exhibit four to five dorsal scars; the frequency of flakes with six-plus scars from roomblocks remains high.

➡ **Platform data:**

Platform morphology changes as flintknappers approach the final stages of tool-making. Cortical platforms are proof that enough of the cortical rind remained to serve as a striking platform, and may therefore indicate early reduction stages. At the opposite end of the manufacturing trajectory are multifacet platforms produced through the careful preparation of a platform during the final trimming of tools. Acute angles, typical of multifacet platforms, usually result from the use of a trimmed biface edge as the striking plane.

Mange (1983) found that platform scar count was one of three most reliable indicators of the reduction stage. In this analysis, platform scar count is represented by two categories: cortical (no scars) and multi-facet (many scars). Other platform types, notably single-facet platforms (one scar), fall in between these extremes or may occur at any stage of reduction (e.g. crushed or missing platforms).

In Table 6.5, the frequencies of cortical, multifacet, and other platform types are tallied by provenience type. For scatters, small structures, and roomblocks, the proportion of cortical platform flakes is high (22.5 to 38.2 percent) while the proportion of multifacet platform flakes is low (2.0 to 4.7 percent). The same is true for pitstructures and middens, although the difference is not as pronounced.

Large scatters, large scatters with features, and small scatters have approximately equal proportions of both platform types. Scatters with features have a higher proportion of multifacet platforms (12.7 vs 8.7 percent cortical platforms).

Table 6.5: Platform Type for Whole Flakes by Provenience Type

Provenience Type	Platform Type: Cortical		Multi-faceted		Other		Total	
Small scatters	13	12.0%	13	12.0%	82	75.9%	108	100%
Scatters	21	38.2%	2	3.6%	32	58.2%	55	100%
Scatters w/features	13	8.7%	19	12.7%	118	78.7%	150	100%
Large scatters	24	18.8%	28	21.9%	76	59.4%	128	100%
Large scatters w/features	38	21.1%	35	19.4%	107	59.4%	180	100%
Small structures	32	25.0%	6	4.7%	90	70.3%	128	100%
Middens	8	16.7%	3	6.3%	37	77.1%	48	100%
Roomblocks	11	22.5%	1	2.0%	37	75.5%	49	100%
Pitstructures	5	14.3%	0	0.0%	30	85.7%	35	100%

➡ Discussion:

Current researchers agree that both a multivariate approach and large debitage samples in well-controlled experimental contexts are necessary for defining reduction stages with confidence. Archeological data, however, are more problematic. Multiple occupations at the same location are likely to influence reduction stage data by mixing stages, so that the goal of reconstructing reduction stage events is of questionable value. It might be more useful to try to determine whether the same kinds of events were repeated in the same places, or whether a mix of different kinds of events occurred. Unfortunately, the mean assemblage size is so small in the Quemado sample that the differential use of places is difficult to compare. When assemblages are grouped by provenience type, we might be able to look at the degree of redundancy of reduction stage events by observing the proportions of flakes in each inferred stage. Equal proportions of flakes in each reduction stage could be construed as a mix of many reduction stage events, while unequal proportions of flakes per stage could indicate either single or redundant events.

The reduction stage rankings suggested by the data and summarized in Table 6.6 indicate that most of the nine provenience types can be categorized with some consistency. Middens form a late stage, low variability category, as inferred from narrow flake size range, no cortex, and a high dorsal scar count. Pitstructures and roomblocks form a middle stage, low variability category, as inferred from wider flake size range, more cortex, and a higher dorsal scar count. Scatters and small structures comprise an early stage, high variability category, as inferred from wide flake size range, a high percentage of cortex cover, a low dorsal scar count, and a high proportion of cortical platforms. Small scatters are an anomalous mix of reduction stages, with contrasting results in length and thickness range, cortex cover, and dorsal scar count. Dorsal scar count and cortex cover covary among the provenience types, strengthening the patterning. Platform type patterning is strongest only for proveniences inferred to represent early reduction stage activities. Different kinds of scatters are dispersed in early, middle, and late reduction stage categories, which points to significant variation in function and occupational history for this group.

Table 6.6: Summary of Reduction Stage Data

Provenience Type	Flake Attribute Variability: Length	Thickness	L/T Ratio (x range)	Cort.:Multifac. Platform	Average Attribute Values: % Cortex	# Scars	Inferred Reduction Stage
Scatters	M-H	M-H	L H	H : M	50-99	0-1	early-middle
Sm. Structures							
Roomblocks	L-M	L-M	L L-H	L-H : L	1-49	2-3	middle-late
Pitstructures							
Scatters/Fea.	M	L-H	L-H L-H	L-H : H	0	2-3	middle-late
L. Scatters/Fea.							
Middens	L-M	L-M	L-H L-H	M : M-H	0	4+	late
L. Scatters							
Sm. Scatters	H	L	H L	L : M	0	0-1	late/mixed stages

➡ **Words of Caution:**

One problem with this scheme lies in inferring the reduction stage from several variables that yield conflicting results, as shown in Tables 6.3 and 6.4. Three factors may contribute to this problem. The meaning of "reduction stage" may be ambiguous among the attributes themselves; for example, noncortical flakes that occur early in the reduction process inflate the 0 percent cortex category and give an inaccurate impression of a high proportion of late stage flakes. Also, the definition of the provenience types may be internally inconsistent and confusing. Finally, a mix of reduction stages may in fact be present at proveniences.

Material Types

As discussed early in this chapter, approximately 99 percent of the lithic raw materials were obtained locally. This emphasis on local procurement suggests that differences in the proportions of lithic materials on proveniences may be related to (1) local mobility patterns (i.e. the patchy distribution of raw materials with a 40 km radius of residences and the strategies devised to get the raw materials to the consumer) or (2) the choice of particular materials for certain tasks.

In Figure 6.7, proportions of the five lithic material types are graphed for each provenience type. Silicified wood is a coarse-grained material with a distinct tabular fracture pattern; the category also includes chalcedonic silicified wood, a milky white, fine-grained high quality material that fractures conchoidally. Quartzite is a "sugary" cryptocrystalline with visible coarse to fine grains. Chert/chalcedony encompasses a wide range of quality, from weathered and chalky material to grainy material difficult to distinguish from quartzite to translucent, glossy material. Crystalline volcanics are made up of basalts and rhyolites. "Other" includes all other documented lithic materials, notably obsidian and indeterminate cryptocrystallines.

All provenience types have a high proportion of silicified wood and a low proportion of "other" materials. Patterns for three other common material types, quartzite, chert/chalcedony, and crystalline volcanics, can be discerned. In the first pattern, the proportion of chert/chalcedony is high, and quartzite and volcanics are poorly represented at small scatters, scatters with features, large scatters, and large scatters with features. In the second pattern, volcanics constitute a high proportion of the total material types at roomblocks, middens, and pitstructures. In the third pattern, quartzite is the most common material type, although chert/chalcedony and volcanics also occur frequently. Provenience types characterized by this pattern include small structures and scatters.

Chi-square tests were run to determine whether there were significant differences in frequencies of the four common material types within each provenience type (Table 6.7). No significant difference was found at the 0.001 level for roomblocks, pitstructures, and scatters, that is, no one material type was found more likely to occur than any other type. The chi-square value for middens is significant at

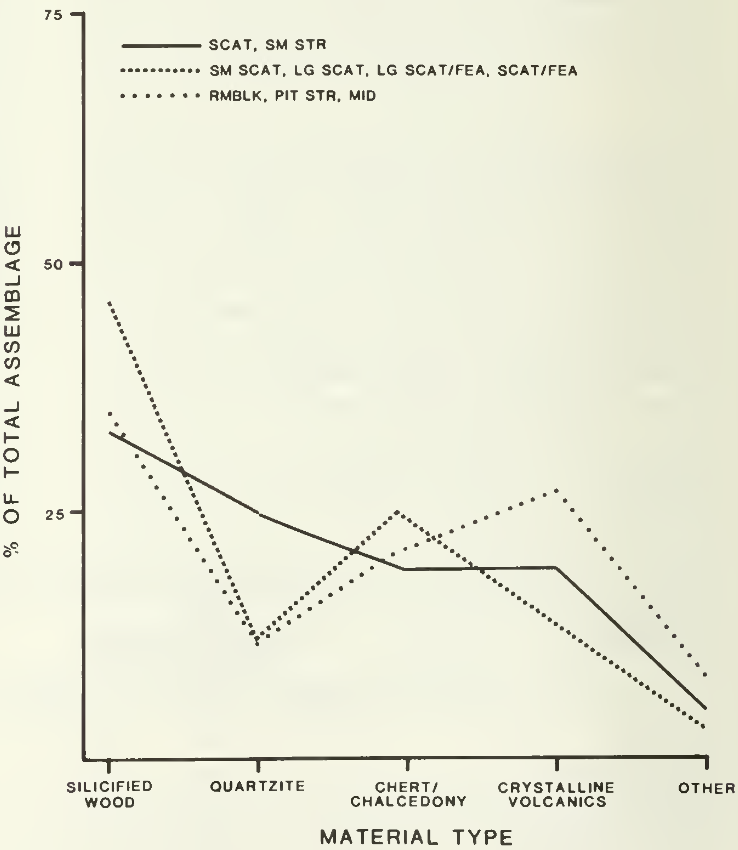


Figure 6.7: Variability in material type among provenience types.

the 0.001 level due to the high proportions of silicified wood and crystalline volcanics, but the value is still far lower than the chi-square values for nonstructural provenience types. At nonstructural provenience types, high frequencies of silicified wood and chert/chalcedony are responsible for significant differences in the occurrence of lithic raw material types. Except at small structures, low frequencies of quartzite are present at these proveniences.

Table 6.7: Chi-square Test Results: Distribution of Common Material Types at Provenience Types

Small scatters	X = 40.6
Small structures	X = 31.6
Scatters	X = 1.6*
Roomblocks	X = 9.9*
Scatters w/features	X = 285.6
Middens	X = 18.5
Large scatters	X = 108.5
Pitstructures	X = 15.4*
Large scatters w/features	X = 63.5

df = 3, X = 16.3 (p = 0.001)
* = No significant difference

In summary, structural provenience types (roomblocks and middens) have random distributions of common material types, while nonstructural provenience types have distributions that depart significantly from random distributions. Scatters are anomalous. The chi-square value for scatters is the lowest of any provenience type, indicating that, as for structural proveniences, common material types occur in frequencies that suggest random distributions.

Material types may have properties that lend themselves to specific uses, regardless of the overall adaptation or place of use. Looking at the entire whole flake sample is a way to discern clues about manufacturing trajectories specific to each material type.

In order to assess differences among material types by reduction stage, the sample of all whole flakes was examined. In Figure 6.8, the amount of cortex on whole flakes is plotted for four of the five common material types.

In Figure 6.9, the dorsal scar count on whole flakes is plotted for the four material types. The results suggest that silicified wood occurs more frequently than other material types in later reduction stage categories, although differences are not great among silicified wood and chert/chalcedony. Quartzite, however, has a different plot, with high proportions of this material type occurring in early reduction stage categories.

Table 6.8 compares the proportion of cortical and multi-facet platforms by material type. Chi-square tests were run on four of the five common material types. No significant difference was found at the 0.001 level among material types for cortical platform flakes, that is, cortical platforms are equally likely to occur on flakes of any material type. For multi-faceted platforms, however, there is a significant difference among material types. Silicified woods, cherts, and chalcedonies occur far more frequently in this later reduction stage category than do quartzites and volcanics.

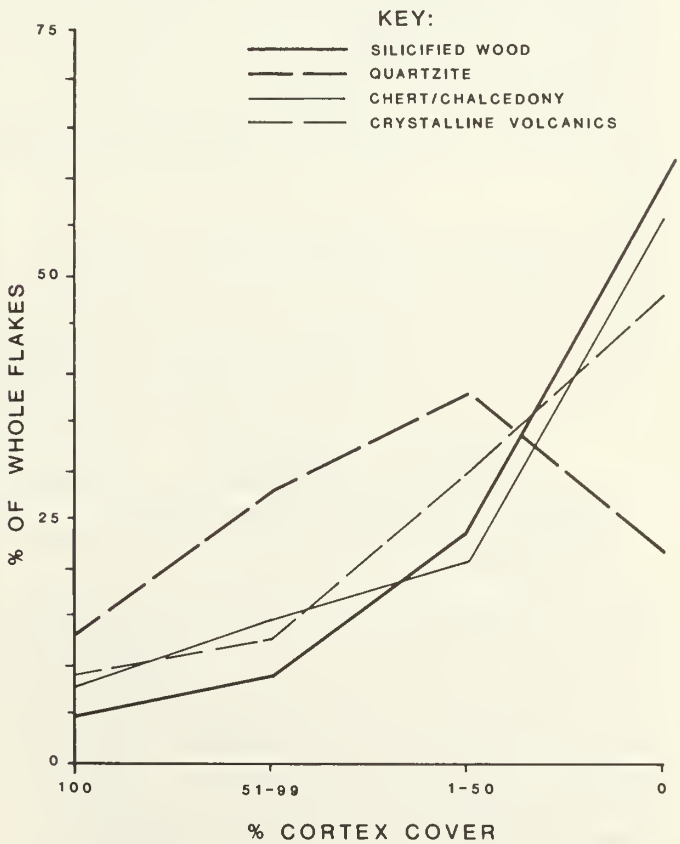


Figure 6.8: Variability in cortex cover of whole flakes by material type.

Table 6.8: Platform Type by Material Type for All Whole Flakes

Material Type	Platform Type			
	Cortical		Multifacet	
	No.	%	No.	%
Silicified wood	43	27.9%	45	45.0%
Quartzite	39	25.3%	2	2.0%
Chert/chalcedony	26	16.9%	40	40.0%
Crystalline volcanic	38	24.7%	11	11.0%
Other	8	5.2%	2	2.0%

Chi-square test results based on four common material types: df = 3, X = 16.3 (p = .001)

cortical platform	X=4.5, no significant difference
multi-facet platform	X=55.1, significant difference

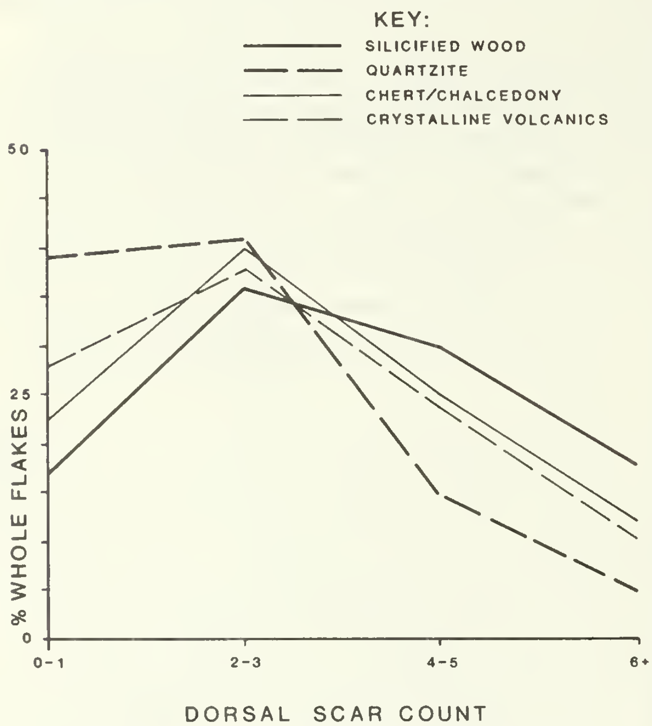


Figure 6.9: Variability in dorsal scars on whole flakes by material type.

When this information is compared with the provenience type plots in Figures 6.2 through 6.6, quartzite appears to be the material type most strongly correlated with attributes representing early reduction stages, followed by volcanics. Quartzites and volcanics occur in high proportions at scatters and small structures. Assemblages at these provenience types are highly variable and are inferred to be early reduction stage assemblages. The material type attributes at these proveniences strongly influence the amount of assemblage variability. Middens, however, have a high proportion of inferred late reduction stage debris, yet they also have a high proportion of volcanics.

At scatters with features and large scatters with and without features, inferred middle to late and later reduction stages correlate with an abundance of silicified wood and chert/chalcedony. We can conclude that lithic raw material type is a determinant of reduction stage trajectories and that the inferred reduction stage of assemblages at different provenience types is influenced by the proportions of lithic materials at those provenience types.

Tools and Assemblage Composition

Since the first lithic studies, archeologists have pondered the meaning of stone tools as time markers, as culture markers, and as indicators of site function. Tools have been considered individually and groups of tools have been viewed proportionately in assemblages. The tools from the SACA project are analyzed as assemblages and examined for several tool assemblage attributes, such as frequency, proportion, diversity, and breakage.

➡Tool Types:

A count of tool types present at proveniences yields some gross trends; for example, hammerstones, manos, and bifaces occur most commonly at proveniences, while unifaces, projectile points, and metates are the least common items. Bifaces occur at 36.4 percent of all proveniences, hammerstones at 44.2 percent, and manos at 35.5 percent. In contrast,

unifaces occur at 14.3 percent of all proveniences, projectiles points at 18.5 percent, and metates at only 9.3 percent. Metates and unifaces do not occur at scatters or at scatters with features; metates and informal tools (utilized and retouched flakes) are not found at pitstructures; and middens do not yield projectile points.

Provenience types were ranked by tool occurrence and the results of the ranking are presented in Table 6.9. Provenience types in the "common" category rank high with respect to the number of locations at which each tool type occurs. Provenience types in the "rare" category rank low with respect to the number of locations at which each tool type occurs. Small structures and middens have high ranks for all types except projectile points. For most tool types, scatters of various kinds and sizes rank low.

While these results are intuitively obvious for most tool groups, there are anomalies that may have more to do with use history than with individual activities at the locations. Large scatters with features rank high for groundstone tools, while other scatters rank low; roomblocks rank high for hammerstones and cores. Artifact distributions at pitstructures frequently include projectile points while those at other structural proveniences do not. These patterns will be interpreted in greater detail below.

➡Tool Assemblages:

Although Table 6.9 summarizes the distribution of tool types at proveniences, tool frequencies must be examined for information about assemblage composition.

Tool frequencies are grouped into provenience types because sample assemblages often consist of fewer than 10 items. An advantage to this procedure is that these groupings may be more justifiably interpreted when viewed as the cumulative debris resulting from a series of events and activities, or as the material history of the use of a place with scatter sizes and the presence or absence of features held constant.Figures 6.10 and 6.11 present the tool proportions for major tool groups. Proportions are calculated in relation to the entire assemblage (including debitage), rather than the tool component.

Large scatters with features and scatters with features show very high proportions of informal tools while scatters exhibit the highest proportion of groundstone. The highest proportions of formal tools and the lowest proportions of informal tools occur at pitstructures, roomblocks, small scatters, and isolated occurrences.

Small structures, middens and large scatters appear to be relatively even in proportions of informal tools, groundstone and formal tools.

Table 6.9: Common and Rare Tool Types at Proveniences

Tool Occurrence	Informal Tools	Unifaces/ Bifaces	Projectile Points	Cores/Hammerstones	Manos/ Metates
Common	large scatters w/features	roomblocks	pitstructures	roomblocks	large scatters w/features
	sm. structures	sm. structures	small scatters	sm. structures	sm. structures
	middens	middens	small scatters w/features	middens	middens
Rare	pitstructures	scatters	scatters	scatters	scatters
	small scatters	large scatters w/features	middens	large scatters	large scatters
	roomblocks	scatters w/features	large scatters w/features	small scatters	scatters w/features

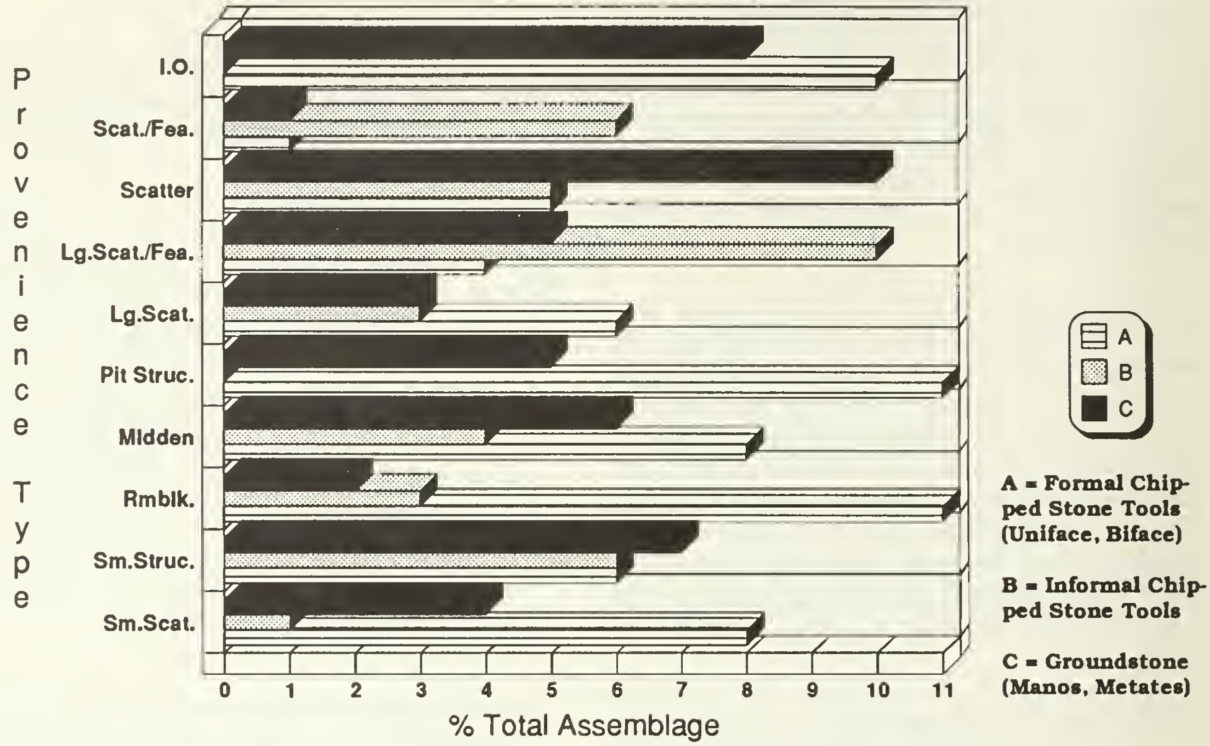


Figure 6.10: Proportion of formal, informal, and groundstone tools among provenience types.

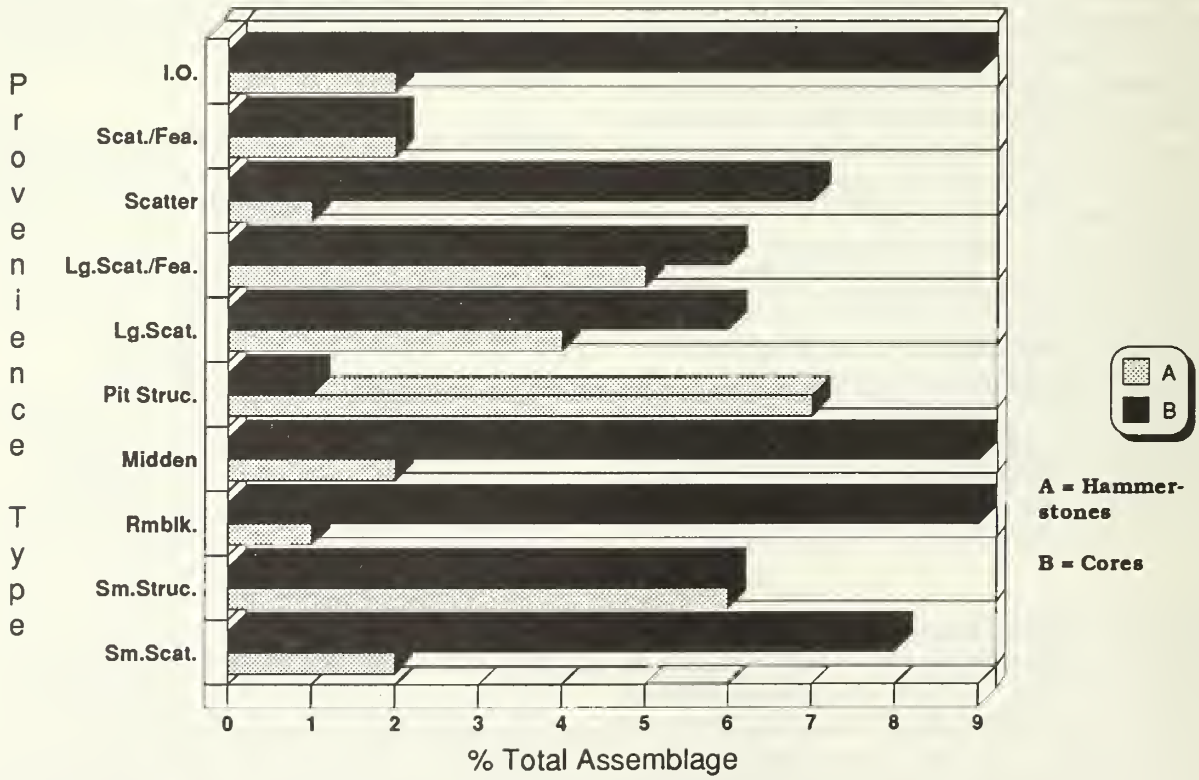


Figure 6.11: Proportion of cores and hammerstones among provenience types.

Small scatters, roomblocks, middens, scatters, and isolated occurrences all have high proportions of cores in relation to hammerstones. At small structures, large scatters, large scatters with features, and scatters with features, the proportions of cores and hammerstones are nearly even; however, at pitstructure proveniences, hammerstones outnumber cores. Implications of these proportions will be discussed in the interpretation section below.

➡Assemblage Diversity and Density:

Another way to look at assemblage variability is through the measurement of the diversity of tool types within each provenience. Two diversity measures were applied to the nine provenience types: the Shannon-Weaver index (Pielou 1975) and a variety index. The latter is simply a proportion calculated by dividing the number of tool types.

The Shannon-Weaver index controls for evenness as well as for variety, so that high values indicate an even dispersion of types in the assemblage as well as a large number of types present. The 11 tool types used in the calculations are single platform core; multiple platform core; other core; informal tool; uniface; biface 1; biface 2; projectile point/biface 3; mano; metate; and hammerstone. In Table 6.10, provenience types are listed by index value from lowest to highest. Both indexes result in similar low, middle, and high rankings, with assemblages from structural proveniences and large scatters with features consistently more diverse than assemblages from other kinds of scatters.

Table 6.10: Provenience Type Rank by Diversity Index-low to High

Mean Shannon-Weaver Index	Mean Variety Index
Scatters with features	Scatters with features
Small scatters	Small scatters
Large scatters	Large scatters
Scatters	Scatters
Roomblocks	Pitstructures
Pitstructures	Roomblocks
Large scatters with features	Small structures
Small structures	Middens
Middens	Large scatters w/features

In Figure 6.12, the mean variety is plotted against the total number of tools per provenience type assemblage, resulting in a plot of the evenness of tool distribution. Large scatters with features, small structures, and middens are all outliers, with high variety indexes. Other provenience types cluster along a regression line with a negative slope, indicating an increase in variety as the tool totals decrease. These results are interesting, since Jones and others (1983) recently demonstrated a strong relationship between frequency and diversity in their assemblages, arguing that artifact diversity is a long linear function of sample size, i.e. as sample size increased in their assemblages, diversity increased. Figure 6.12 demonstrates the opposite effect — as the tool frequency decreases, the tool diversity increases for six of the nine provenience types.

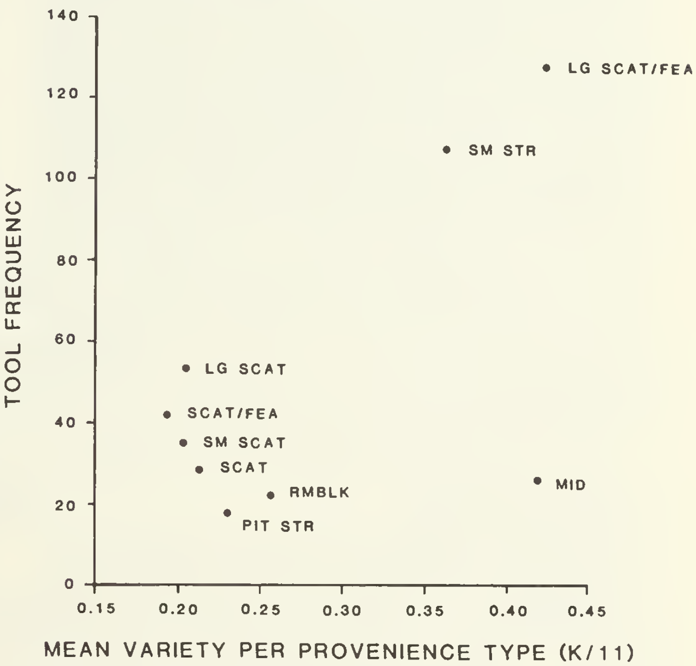


Figure 6.12: Mean variety index vs. tool frequency among provenience types.

The diversity relationships of Jones and others (1983) suggest a set of expectations that link assemblage size with assemblage diversity, based on sampling bias. Principal expectations are the following:

1. Large total assemblage size correlates with high assemblage diversity.

2. Large tool assemblage size correlates with high tool diversity.

Other possible expectations are:

3. Large total assemblage area correlates with high assemblage diversity.

4. Large total assemblage area correlates with large total assemblage size.

5. Large total assemblage area correlates with large tool assemblage size.

In order to examine these relationships in the SACA assemblages, several correlations that are relevant to this problem were calculated for the total assemblage from all nine provenience types (Table 6.11), using sample area, assemblage size, and tool frequency variables. Results indicate that assemblage diversity correlates strongly with both total artifact frequency and tool frequency, while tool frequency correlates strongly with total artifact frequency, as shown in Figure 6.13; however, there is a low correlation between sample area and diversity. These relationships are in line with the expectations of Jones and others (1983). Sample area is also weakly correlated with tool frequency, total assemblage size, and the proportion of formal tools in assemblages.

Figures 6.12 and 6.13 offer contrasting patterns in the relationship between tool frequency and diversity. Tool frequency increases with total assemblage size (Figure 6.13). Given the above sets of expectations, we could expect tool variety to increase as well; however, in six of nine cases tool variety decreases as tool frequency increases (Figure 6.12). If sampling bias (as construed by Jones and others (1983) were an important factor influencing these relationships, we would expect the opposite pattern, i.e. tool variety would increase as tool frequency increases. Other factors appear to be responsible for these patterns and will be addressed in the conclusions to this chapter.

➡Breakage:

Data on breakage of formal tools — unifaces and bifaces — can inform us about discard behavior. When these data are combined with provenience information, patterns which rep-

Table 6.11: Correlations Relevant to Assemblage Size Diversity Relationships

	Sample Area	Assemblage Size	Tool Frequency
Informal Tool total	0.276*	0.381	0.301
	0.003	0.0001	0.001
	112	112	112
Formal Tool Total	0.311	0.162	0.153
(unifaces + bifaces)	0.007	0.172	0.198
	73	73	73
Assemblage Diversity			
- Variety	0.175	0.509	0.827
	0.090	0.0001	0.0001
	95	95	95
- Shannon-Weaver Index	0.210	0.482	0.751
	0.026	0.0001	0.0001
	112	112	112
Tool total (includes cores)	0.207	0.694	
	0.028	0.0001	
	112	112	
Assemblage Total	0.188		
	0.047		
	112		

* Correlation coefficient
Probability
Number of proveniences in sample

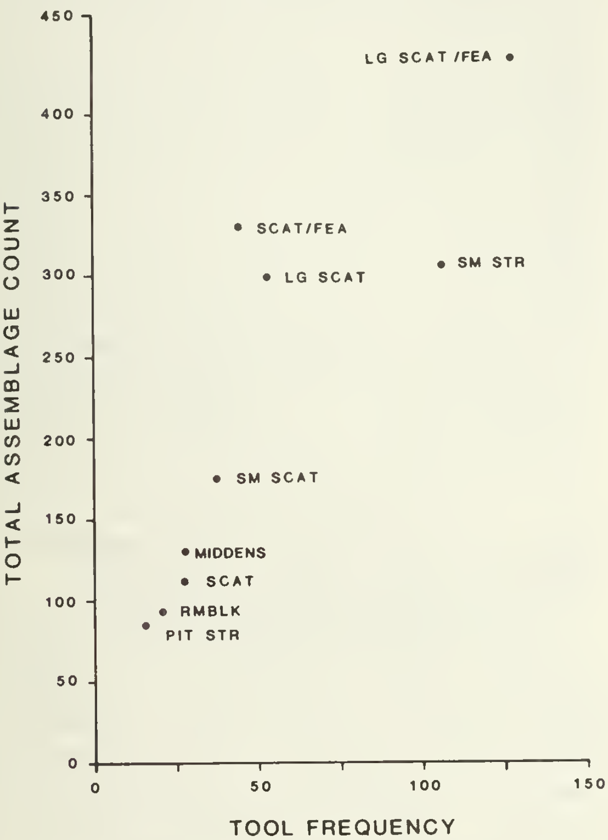


Figure 6.13: Tool frequency vs. assemblage size among provenience types.

resent differences in the loci of retooling may be discerned. As with many recent typologies of assemblage variability (e.g. Camilli 1983; Leonard et al. 1984; Nelson and Camilli 1984; Vierra and Doleman 1984), concepts of land use and the organization of technology (Binford 1978, 1979, 1980, 1982) form the basis for the following assumptions. For the sake of simplicity, it is assumed that informal tools are expediently manufactured, that formal tools are curated, and that bulky, heavy tools (manos, metates) are site furniture, or facilities that "go with" a place (see Binford 1979).

If the role of places in subsistence planning is examined, the assumption may be made that residences are the sites of retooling and discard of broken items, especially curated items that involve repair or insertion into complicated hafts (Keeley 1982), whether they are classified as formal or informal tools. Special task or other short-term occupation loci are likely to be the sites of the use and discard of expedient tools (unhafted items like backed blades or sharp-edged flakes, or easily replaced broken hafted items) and of the discard of useless pieces of curated tools (e.g. tips and midsections of projectile points). All sorts of items that have nothing to do with the function of a place may be manufactured there (Binford 1978) and discarded after manufacturing errors.

At the nine SACA provenience types, counts for tool breakage categories other than "whole" or "indeterminate fragment" are low, although some trends that are not statistically significant are evident in the distribution of whole and broken tools. Bases and whole items with broken bases occur more often in structural contexts, while tips and midsections occur exclusively at scatters. This supports the above assumptions about retooling or recycling tool bases and tools with broken bases at residences. It appears, however, that retooling may have occurred at scatters as well because of the presence of bases at scatters. However, the breakage patterns at scatters may be the result of tool discard at the loci of use rather than at the retooling site. Whole items with broken tips occur at scatters, but are not found in structural contexts. A high proportion (96.4 percent) of isolated tools are whole items; the remaining items include a tip, a midsection, and an indeterminate fragment.

Chi-square tests were run first on whole items and then on indeterminate fragments to determine whether or not there are significant differences in the distribution of these kinds of items among provenience types. No significant difference was found among provenience types for either whole items or indeterminate fragments. In order to ascertain whether there were significant differences in the occurrence of other breakage types such as bases, tips, and midsections (excluding whole items and indeterminate fragments), another chi-square test was run. Again, results indicate no significant differences among provenience types. Additional chi-square tests were run to determine whether whole items and indeterminate fragments are distributed evenly among all formal tool types. Results indicate no significant difference for whole items or for indeterminate fragments.

➡ Density:

Figure 6.14 plots the density distribution for each provenience type. Scatters, large scatters, and large scatters with features lie at the low density, narrow range end of the graph; middens, roomblocks, small structures, and scatters with features are in the low density, medium range area, while pitstructures and small scatters have a much higher overall mean density of items as well as a far greater range in density.

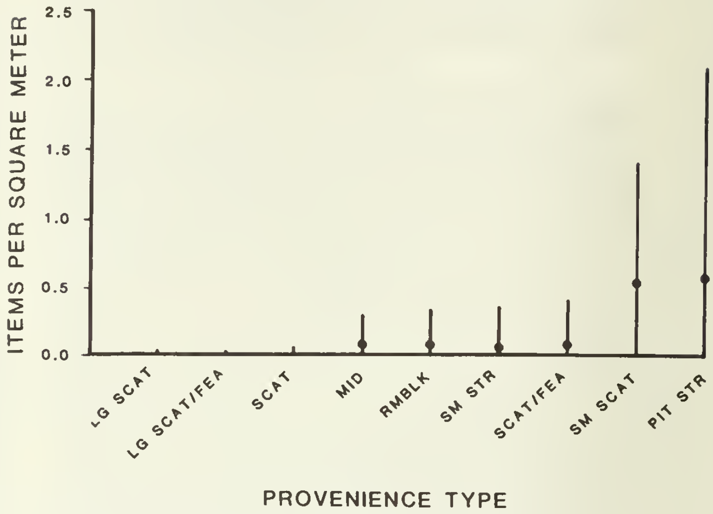


Figure 6.14. Range of lithic artifact density among provenience types. (Black tic or circle represents overall mean per provenience type.)

Summary

Results of the analyses have been discussed and presented in table and graphic form. Several observations can be made concerning the patterns summarized in Table 6.12.

➡ Reduction sequence:

Late reduction stage is inferred from a narrow range in flake length and thickness, from high dorsal scar counts, from a low proportion of cortex, and from high proportions of multifacet platforms on flakes.

Proveniences with inferred late reduction stage assemblages are middens and large scatters. Assemblages from roomblocks, pitstructures, large scatters with features, and scatters with features consist of middle to later reduction debris. Small scatters are comprised predominately of late stage debris, with a mixture of debris from other stages.

An early to middle reduction stage is inferred from the wide range of flake length and thickness, low dorsal scar counts, a high proportion of cortex, and from high proportions of cortical platforms on flakes. These characteristics fit the assemblages from small structures and scatters.

Structural and nonstructural proveniences do not fall neatly into late and early reduction stage categories. Rather, the inferred reduction stage cross-cuts the provenience types.

Table 6.12: Assemblage Composition Patterns for Provenience Types

Assemblage Attribute	Middens	Room-blocks	Pit Struc.	Small Struc.	Lg. Scat. w/Fea.	Scatters w/Fea.	Large Scatters	Scatters	Small Scatters
Reduction Stage	Late	Middle-Late	Middle-Late	Early-Middle	Middle-Late	Middle-Late	Late	Early-Middle	Late-Mixed
Material Types	Nonrndm Selection	Random Selection	Random Selection	Nonrndm Selection	Nonrndm Selection	Nonrndm Selection	Nonrndm Selection	Random Selection	Nonrndm Selection
% Formal Tools	High	High	High	Medium	Medium	Low	Medium	Medium	High
% Informal Tools	Medium	Low	Low	Medium	High	Medium	Low	Medium	Low
% Ground-stone	Medium	Low	Medium	High	Medium	Low	Low	High	Medium
% Hammer-stones	Low	Low	Medium	Medium	Medium	Low	Low	Low	Low
% Cores	High	High	Low	High	Medium	Low	Medium	High	High
Diversity	High	Medium	Medium	High	High	Low	Low	Medium	Low
Density	Medium	Medium	High	Medium	Low	Medium	Low	Low	High

Middens consist of late reduction stage debris, as expected, because they are formal dumps from household maintenance and flintknappers generally work outdoors, except perhaps to resharpen tools. The "indoor-outdoor debris" rationale is less successful for roomblocks, pitstructures, and small structures, since their surfaces may consist of post-depositional fill and they may have been scavenged or reused by later occupants. Small structures not only do not fit the late reduction stage expectation for residences, but appear to be the loci of early stages of lithic manufacturing. Scatters of all types are extremely variable as to inferred reduction stage. This variability may be a result of both the wide range in functions and in use-histories of scatters.

➡ **Material type:**

Structural proveniences have the widest range of material types, as would be expected in a logistical system where retooling takes place at residential sites. Most scatter types are highly variable in material type proportions. This variability may result from the reduction of lithic material procured nearby to enhance core portability, or from the expedient use of nearby materials to the exclusion of other materials.

➡ **Tool proportions:**

Tool proportions are even at small structures, middens, and large scatters. Elsewhere, formal tool proportions are inversely related to informal tool proportions. Small scatters, roomblocks, and pitstructures have high proportions of formal tools and low proportions of informal tools; large scatters with features and scatters with features exhibit the reverse. Groundstone tool proportions remain fairly constant across all provenience types, except for a low proportion in roomblocks and a high proportion in scatters. Manos, hammerstones, and bifaces are ubiquitous tools. While manos and hammerstones are assumed to be site furniture, the function of bifaces is ambiguous. They may be core resources, failed tool blanks, or failed or exhausted tools.

The distribution of cores and hammerstones differs from that of formal tools, informal tools, and groundstone. Equal proportions of cores and hammerstones are found at small structures, scatters with features, and large scatters with features. High core proportions at small scatters and scatters resemble the proportions at roomblocks and middens. High core proportions may indicate a caching strategy for raw materials (ad hoc storage on the surface). Core and hammerstone proportions seem to bear little relationship to groundstone or formal tool proportions among the provenience types.

In sum, the tool and debitage assemblages of middens and the tool assemblages of small structures seem to be characterized by redundant, even distributions. Assemblages from other provenience types are more variable.

➡ **Diversity and density:**

Diversity indexes bear out the expectation that trash assemblages associated with structures will reflect a variety of domestic activities; assemblages from middens and small structures are most diverse. Assemblages from large scatters with features are also diverse, which suggests that these scatters may have functioned as residential camps or may represent multiple occupations of the same place for different functions. Scatters dominate the low density ranks, while pitstructures and small scatters represent the highest densities but also the highest degree of variability in density. In some respects, assemblages from small scatters and pitstructures seem to parallel one another. Both are high density, later reduction stage assemblages with high formal tool proportions, low informal tool proportions, and medium groundstone tool proportions.

➡ **Breakage:**

The breakage data offer few patterns in the distribution of whole and indeterminate fragments at provenience types. Projectile points, however, conform to our expectations of retooling at residential (i.e. structural) locations, since bases and whole items with broken bases occur more often at these proveniences.

Interpretation: Growth Models and Occupational History of Scatters

The all-observed sample is an extremely versatile data base that lends itself to an array of manipulations. The patterning reported here is based on only one means of organizing the data, that of grouping them into descriptive

provenience types. The results suggest a number of hypotheses regarding the occupational history of SACA.

The relationships among provenience area, assemblage frequency, and assemblage composition form the basis for models of the occupational history of places, i.e. how small scatters grow into large scatters over a period of use. The linear size/variety relationship that Jones and others (1983) describe in reference to sampling bias can be rephrased in terms of occupational history, for example, small sites cover a small area and have a small, low variety assemblage. As sites grow in size (through reoccupation), assemblage size and variety increase (Camilli 1983). Thomas (1983) observes the same relationship in his Monitor Valley assemblages, but he also points out that it is not a necessary relationship (i.e. reoccupation of sites could as easily result in no increase in assemblage variety) and that the causes for this kind of distribution are poorly understood.

Model 1

If the SACA data conformed to a growth-in-size:increase-in-diversity model, small scatters would be highly variable, since each one would represent a single occupational episode with a small, low diversity assemblage even though a wide range of differences exists among the assemblages. Variety and frequency would increase with assemblage area.

Scatters without features do, in fact, conform to this model. They exhibit a consistently high variation in attribute values and encompass a variety of artifact types as well as, notably, early reduction stage debris. This high degree of variability is not shared by scatters with features, large scatters, or large scatters with features. These provenience types cluster in the middle range of variability along with small scatters.

Model 2

A contrasting model might be termed the "linear growth" model (that Vierra and Doleman 1984 interpret as indicating foraging behavior), in which there is little change in assemblage diversity or tool proportions between small scatters and large scatters. This model suggests that large scatters are composites of many similar smaller scatters, i.e. large scatters result from extremely redundant use of the same area. In contrast, the Jones and others (1983) model (Model 1) is one in which the content of a scatter changes as it grows. An examination of the tool proportions in scatters versus large scatters and in scatters with features versus large scatters with features reveals strong patterns that correspond with each model. Scatters without features conform to Model 1, while scatters with features conform to Model 2.

Tool proportions at scatters are not the same as those at large scatters — the proportions of formal tools and groundstone tools are reversed at large scatters from their proportions at scatters (Figure 6.10). This pattern negates a linear growth model, i.e. large scatters are not composites of many similar smaller scatters with constant rates of discard for each tool type, rather they change in composition as they grow because tool types are not discarded at constant rates. Groundstone forms a disproportionately large proportion of the assemblages only at scatters. This difference may be a result of the use of groundstone as site furniture at scatters during all stages of growth. Since groundstone implements "go with" a place in the same way that hearths do, they may not be carried in and discarded during each occupation as are chipped stone tools. Instead, site furniture and insurance gear (e.g. groundstone, hammerstones, cores) may be stored at a place depending on the likelihood of reuse of that particular locations. Consequently, as the overall item frequency increases through the addition of chipped stone tools and debris, the groundstone count stays the same (Camilli 1983).

Cores behave similarly to groundstone. Cores are ubiquitous at scatters but their proportion drops at large scatters. In contrast, hammerstones do not appear to function as site furniture since they increase in proportion from low at scatters to higher at large scatters. The range in the proportion of hammerstones among provenience types is much greater than it is for groundstone. The function of hammerstones is likely to cover a broad range of activities, from resharpening groundstone items to manufacture of chipped stone to a

variety of chopping and pounding chores involving other hard and soft materials. Variability in hammmerstone proportions may reflect these multiple roles, while high proportions of hammerstones at small structures and pitstructures may indicate specialized or intensely performed tasks at these locales. SACA hammerstones are often made of petrified wood with an obstructive grain. The grain may have predisposed them to perverse fractures or to difficulties in resharpening that shortened their use life and had the net result of inflating their proportion in assemblages.

Large scatters with features conform to a linear growth model (Model 2). They appear to consist of many redundant smaller scatters with features. The consistently high proportion of informal tools (Figure 6.10) in association with both small and large scatters with features, but not scatters without features, suggests that differences between these provenience types can be attributed to behavioral factors, not merely to differential preservation or burial of hearths or to sampling bias. Core and hammerstone proportions on scatters with features and large scatters with features remain relatively constant (Figures 6.10 and 6.11), along with groundstone and informal tool proportions.

Smaller scatters with features seem to accrete proportionately into large scatters with features, perhaps by the addition of more of the same units that consist of hearth-based assemblages; scatters without features do not accrete this way. Instead, some tool types increase in proportion while other remain constant, suggesting that the constant tool types (groundstone, cores) function as site furniture. If principles (similar to the concept of site furniture) that govern the rate of accretion of particular tool types can be devised, our understanding of prehistoric patterns of land use over time will be enhanced.

One would expect small scatters to share the characteristics of scatters, i.e. high variability in most assemblage attributes, but they do not. Scatters without features constitute a highly variable provenience type, possibly because they represent different stages in the Model 1 redundant use of landscapes. Perhaps if small scatters with features were separated from small scatters without features, the pattern would split into the two models described above. A provenience typology that separates lithic scatters from sherd and lithic scatters might also result in insights about the growth of scatters. As would be expected, isolated occurrences exhibit the greatest degree of variability, but tool proportions are similar to those for small scatters.

Structural Provenience Types: Ideas about Occupational History

A third model should address the occupational history of structural proveniences. We have no basis, however, for longitudinal comparisons of structural proveniences using only lithic data. The samples are too small, and there is no reason to assume that small structures grow into roomblocks or refuse scatters grow into middens, although they may. No model is presented here, but this discussion broaches some ideas about the occupational history of structural provenience types.

1. **Middens** conform to our expectations about residential dumps. The high proportion of cores at middens may indicate disposal of exhausted items. The even proportions of other tool types at middens suggest constant discard rates for domestic tool types.

2. **Roomblocks** are far more variable than middens for most lithic attributes, as are pitstructures. These two structural provenience types share a history of dynamic post-depositional processes, i.e. massive fill accumulation through the collapse of walls, structural collapse caused by fire, or trash dumping by later occupants. These processes make it problematical to infer prehistoric activities at the time of occupation from present surface assemblages. Yet surface assemblages – sometimes dense ones – are found on roomblocks and pitstructures. In terms of tool proportions, the main difference in these two provenience types is in the reversal of core and hammerstone frequencies: roomblocks have a high proportion of cores, while pitstructures have a high proportion of

hammerstones. The high proportion of cores at roomblocks may represent a stock or cache of raw materials in the form of cores to be used for retooling or as insurance gear.

View characteristics of roomblocks and pitstructures may account for some of these patterns. Roomblocks are often prominent landmarks with a good view, which may give them a high potential for use as logistical outposts or special task sites by later occupants after initial abandonment. Their high visibility also adds to their chances of being picked over by casual artifact collectors. Pithouses are not highly visible, which may account for their higher artifact density and the fact that they are the only structural provenience type at which projectile points were found.

3. Small structures lack the characteristics of other structural provenience types and share many characteristics with scatters. These traits point to significant differences between the occupational history of small structures and that of other structural provenience types. Seasonal or sporadic reoccupation by special task groups may account for the differences.

Assemblage Variability in the Remainder of Samples

Most of the effort in lithics analysis has been expended on data from the all-observed samples, because these samples are the most reliable and offer the strongest basis for inference. The other samples make up a large portion of the data base, but their potential for contributing information about lithic technology in west-central New Mexico will remain largely untapped by this study.

Appendix 3 lists all lithics data, including the all-observed attribute data discussed in the preceding sections. It is clear from the reduction sequence and material type counts that structural proveniences have a higher proportion of primary reduction debris as well as a high proportion of quartzite and rhyolite material types than nonstructural provenience types. As discussed above, quartzites and volcanics occur most frequently in early reduction sequences.

A high proportion of nonstructural proveniences have cores and projectile points; a low proportion have metates, informal tools, and unifaces. Other tool types occur in nearly equal proportions on structural and nonstructural proveniences. These gross trends parallel the results of the all-observed sample analyses.

Projectile Points

Figures 6.15 through 6.17 illustrate the SACA projectile points, loosely organized by size and shape, that are complete enough to be temporally diagnostic. Unnotched points (Figure 6.15a-c) and stemmed points (Figure 6.15d-k) may be of PaleoIndian and Archaic manufacture (the exception is 6.15a, which is probably a small nondiagnostic biface). Large and medium-sized corner-notched points (Figure 6.16a-g) and side-notched points (Figure 6.16h-n) may be of Archaic manufacture.

Small corner-notched points (Figure 6.17a-c) and side-notched points (Figure 6.17e-n), many of which are asymetrical and bear multiple notches or serrations, are likely to be of the Puebloan and later prehistoric period. Gossett (1985) has recently sythesized projectile point data from west-central New Mexico and has compared them with the Oshara sequence (Irwin-Williams 1973) and the Cochise sequence (Sayles and Antevs 1941). Morphological comparisons will not be detailed here.

The morphological range for projectile points found in the SACA is broad and includes forms believed to be diagnostic of PaleoIndian through Puebloan times. Examples of projectile points similar to those of the Bajada, San Jose, Armijo, and En Medio complexes of the Oshara tradition (Irwin-Williams 1973:Figures 3-6) are represented, as well as examples of points similar to those of the Cazador, San

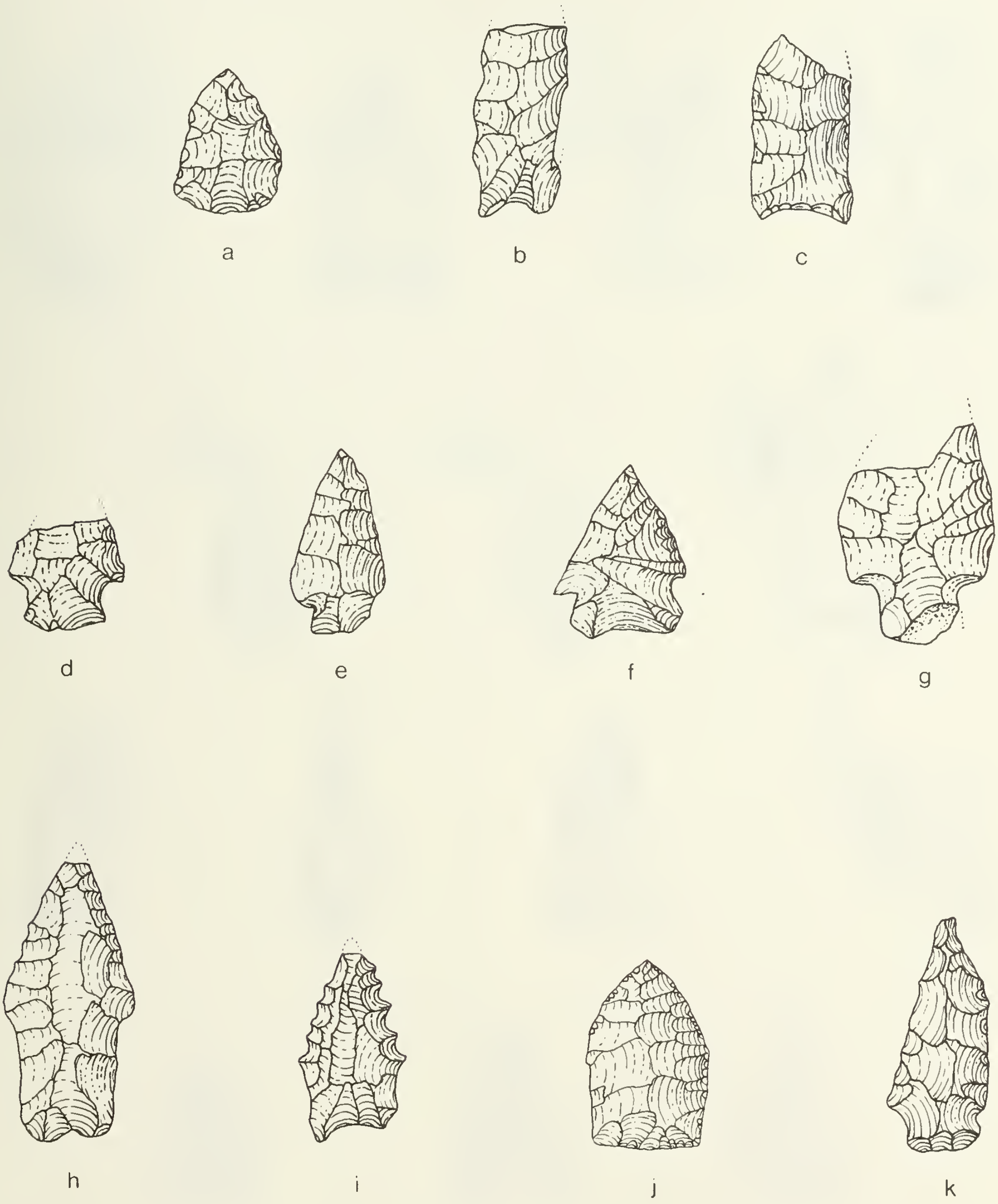


Figure 6.15: Unnotched and stemmed projectile points.

Figure 6.16: Large and medium-sized corner-notched and side-notched projectile points.

Figure 6.17: Small corner-notched and side-notched projectile points.

Pedro, Chiricahua, and Early Pottery horizon stages of the Cochise culture (Sayles 1983: Figures 6.16, 9.4, 10.4, 11.3). As has been frequently documented on previous surveys (e.g. Eck 1982) these points often occur in contexts that do not reflect their supposed antiquity, e.g. the reworked stemmed point (Figure 6.15 j), found on a Puebloan site, appears to be a modified Scottsbluff type of late PaleoIndian original manufacture. This was the only lithic artifact collected and it will be curated at the Laboratory of Anthropology in Santa Fe.

Recommendations

The most pressing problems encountered with on-site lithic analyses are (1) how to sample proveniences with high artifact densities adequately; (2) how to define proveniences consistently so that lithic samples mesh with ceramic and other artifact analyses; and (3) how to sample equal and comparable proportions of different provenience types adequately.

Surface data have a tremendously under-exploited potential to contribute to lithic studies. Sampling priorities for project areas and for "sites," which are in many ways outmoded, misleading and unworkable observational units, need to be worked out and put into practice. Use of a movable grid system (cf. McAnany et al. 1984) can make on-site analyses of high artifact density areas feasible.

A small quantity of high quality data recovered from well-controlled contexts is more valuable in terms of information content and research potential than a large quantity of low quality data. Collecting all-observed attribute data, especially from the under-represented architectural provenience types, should be a priority for future work, even if other aspects of lithic analysis are sacrificed.

Chapter 7

Settlement Components in the Moderate Production Area

Chapter 7 examines ceramic and lithic assemblage content at inventoried sites in the SACA. Analysis focuses on assemblages of all-observed sherds at sites with a range of feature and architectural associations and on grid samples of sherds from middens.

The first section of the chapter describes ceramic ware and vessel form proportions at sites and proveniences and how these vary among sites lacking features and those with features, structures, and middens. Variations in ceramic ware and vessel form proportions will be used to gauge the potential that site groups contain places that were reused or intensively used in the past.

The second section of Chapter 7 offers models of occupational history and its effect on assemblage content at sites. Analyses identify site groups with associations of ceramic wares and vessel forms. Lithic assemblage attributes and types of features and structures characteristic of each ceramically-categorized site group are used to assess the applicability of use-history models to archeological sites or proveniences in the Moderate Production Area.

Ceramic Assemblage Descriptions

Given the expected composite nature of the archeological record as discussed in Chapter 3, occupational histories will probably vary among sites in the Quemado area. This section describes ceramic assemblage variability at sites classified in groups based on the various types of features and structures. These groupings represent an initial control over some of the variability in occupational history among sites, but do not automatically distinguish among long-term versus short-term use of site locations. The ceramic attributes of assemblages examined in this section are proportions of various decorated and utility wares and of sherds representing diverse vessel forms. Differences in vessel form and ware proportions are compared among assemblages grouped by associated features and structures with the goal of understanding variations in assemblage content and how they may stem from site use-history.

Site/Provenience Analysis

Ceramic assemblages are compared among the following six site classes: artifact scatters (1) with and (2) without associated features; (3) at structures; (4) at rooms; (5) at roomblocks; and (6) at middens (Tables 7.1a and 7.1b). Each class has previously been described in Chapter 5. All recorded assemblages in the Moderate Production Area are compared graphically.

Descriptive statistics in Tables 7.2 through 7.6 are offered only for "all-observed" ceramic inventories that recorded 100 percent of the ceramics at sites in each class and for grid samples from middens (Table 7.1b). Samples from pitstructures and other types of features are too few to be dealt with in this manner and are not discussed here.

Table 7.1a: Ceramic Samples by Features and Sample Type

FEATURES	GRID + OTHER SAMPLES		ALL-OBSERVED SAMPLES	
	# Samples	# Sherds	# Samples	# Sherds
Ceramic Scatter	--	--	3	40
Lithic/Ceramic Scatter	5	530	29	616
Scatters with Features	6	593	28	757
Scatters with Structures	14	1389	22	1797
Pit structures	4	795	3	339
Roomblocks	3	1477	23	2947
Rooms	--	--	5	1074
Middens	25	4779	1	188
Dance Plaza	1	76	2	335
Earthworks	1	264	--	--

Table 7.1b. Sherd Frequencies in All-observed Inventories and Midden Samples

Site Class	N	Total	Mean	Minimum	Maximum
Lithic/Ceramic Scatter	29	616	21.24	1	71
Scatters with Features	28	757	26.85	1	148
Scatters with Structures	22	1,797	81.68		247
Roomblocks	23	2,947	128.13	5	400
Rooms	5	1,074	214.80	2	747
Middens	26	4,967	191.38	8	654

Ceramic Assemblage Variables

The five assemblage variables compared here are differentiated by relative proportions of sherd categories. Classes are based on relative percentages of (1) utility wares, (2) graywares, (3) redwares, (4) jar sherds, and (5) decorated jar sherds. The utility ware category includes both graywares and brownwares; the proportion of sherds in this category was calculated by assigning all whiteware, redware, and decorated Mogollon wares to a decorated category. Grayware proportions were calculated based on the total number of grayware and brownware sherds, thus this variable gauges the contribution of graywares and brownwares to the utility ware category. Redware sherd proportions are based on a combined total of redware and whiteware sherds. Jar sherd proportions are based on a combined total of bowl and jar sherds, which does not include ladle sherds or sherds of indeterminant form. The figures in this section illustrate proportions of both types of sherds contributing to each category.

The mean percentage, coefficient of variation (C.V.), and interquartile range (I.R.) of each variable are listed for each site class. The C.V., expressed as a percentage, indicates the variability among assemblages and samples relative to the central tendency, rather than relative to the mean (Thomas 1976:82-84). The I.R. divides the range of variability into quarters and presents the lowest and highest average percentages relative to these quarters, rather than the absolute extremes of percentages.

If utility ware and jar sherd frequencies are functional characteristics of ceramic assemblages, then we could expect variation in

the proportions of different vessel types among site classes. The functional determinants for the occurrence of these sherd types differ from those of brownwares and redwares in that proportions of the latter increase at some sites occupied after about A.D. 1050 within the study area, indicating trends in the social and functional character of occupations after this time. It is important to note which classes of structures and features occur with brownwares and redwares in order to understand these trends. Variation in proportions of utility ware and jar sherds in assemblages may more directly reflect the types of activities and sequences of events at site locations used in the past, than do the wares which reflect changes in regional ceramics through time. Relationships among ware proportions, structures, and features are addressed below.

Site Classes

Artifact scatters at rooms, roomblocks, and middens and relatively low density scatters with and without associated features and structures yielded inventories of recorded ceramics. All observed sherds at sites were recorded at these places with the exception of midden deposits.

➡Artifact Scatters:

Artifact scatters comprise the largest site class sampled. This class is divided into three groups: scatters without associated structures or features, those associated with features only, and those associated with structures but without discernible dumps or middens.

Utility ware proportions at scatters with and without features vary considerably (Figure 7.1). The C.V. and I.R. for utility wares (Table 7.2) express the high degree of variability among these two scatter classes. This variability is probably determined to a great degree by differences in the occupational histories of sites in these groups as well as by differences in activities performed at places; that is, assemblages from single use and multiple use locations, are included in the ceramic assemblage inventories examined here.

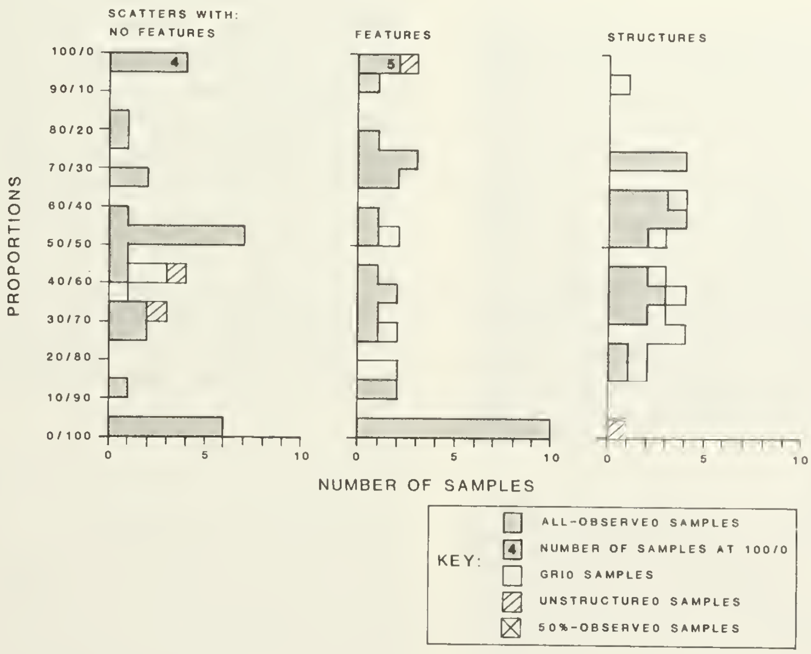


Figure 7.1: Decorated/utility ware proportions in scatter assemblages.

Table 7.2: Utility Ware Sherd Proportions in All-observed Inventories and Midden Samples

Site/Provenience Features	N	Mean Percent	C.V.	I.R.
Lithic/Ceramic Scatters	29	50.21	65.10	27.6-73.2
Scatters with Features	28	57.32	62.47	28.8-100.0
Scatters with Structures	22	48.41	34.71	35.7-63.07
Roomblocks	23	45.29	44.04	32.3-61.3
Rooms	5	46.18	56.44	22.0-70.80
Middens	26	57.72	21.26	50.5-67.05

In contrast, scatters associated with structures seem to cluster with an I.R. of between 36 and 63 percent utility wares and a C.V. of about half of that of the other two scatter classes. Ceramic assemblages at scatters with structures may as a group represent site locations with occupational histories which are more similar to each other than do scatters in the other two site classes.

The presence of relatively small, one- to six-room, structures at sites in this class indicates a potential functional similarity among assemblages.

Structural sites may represent places used repeatedly and/or long-term residences compared with assemblages from scatters without associated structures. Accordingly, a fuller range of activities in the repertoire of possible domestic and processing activities at seasonal or longer-term residences may be represented in assemblages as greater numbers of vessels and wares. In comparison to assemblages at sites used only once or twice, the redundant character of activities at more intensively used places will ensure that, over time, general proportional similarities in classes of items will occur among sites.

Grid samples taken at structural scatters (Figure 7.1) tend to reinforce this inference, since they exhibit an even tighter clustering of utility ware percentages. Grid samples are generally more similar to each other than are the all-observed inventories, and counts from grid samples average 145 sherds compared with an average of 40 from all-observed inventories. Samples from grids would be the ones most likely to represent reused places since grids are used to sample high density scatters (see Chapter 5 sampling discussion), which are most likely to represent multiple events and areas where repeated artifact deposition has occurred.

While it seems that the conclusion of intensive or repeated use of site locations with structures is only natural, because we think of areas around structures and the structures themselves as good candidates for seasonal reuse or long-term habitations, the scatters associated with structures are a good control case. That is, they represent the extreme case in which most are used for more than a single event.

It is highly likely that other areas where structures were not built were also used in a cyclical fashion for many different activities. Given this possibility, high variety, high frequency assemblages from nonstructural scatters that represent event composites will exhibit similar proportions of sherd classes due to the repeated occurrence of similar activities and events forming composite distributions.

To examine this idea more closely, assemblages from 29 scatters lacking features were inspected for sherd frequency, number of sherd types, and utility ware proportions. The number of types for these all-observed inventories ranges from one to 18 types (Figure 7.2) and sherd frequency between one and 98 items. Seventeen low variety assemblages (one to four types) in this group are, not surprisingly, low frequency assemblages as well, representing a maximum of between one and three vessels and potentially fewer events or activities than high variety assemblages.

Only 18.75 percent of the low variety (one to four types) scatters exhibit utility ware proportions in the 35 to 65 percent range (the range in which assemblages from scatters with structures cluster), most being made up of almost 100 percent utility or decorated wares. Twelve assemblages from scatters with no features have five or more sherd types. Of these, 66 percent cluster in the same range of utility ware proportions as do the assemblages from structural scatters.

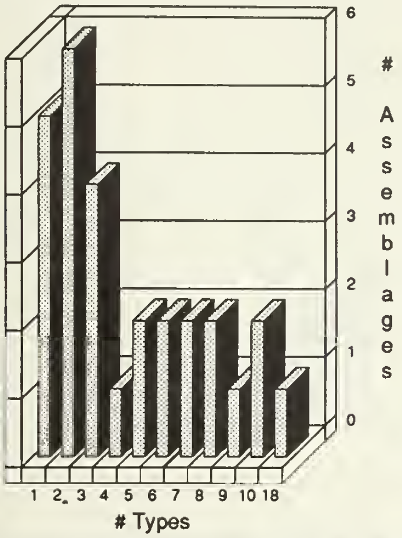


Figure 7.2: Distribution of number of ceramic types for assemblages lacking associated structures and features.

In a manner similar to structural scatters, the nonstructural artifact scatters containing a relatively high variety of pottery types and relatively equal proportions of utility and decorated wares could potentially represent multiple activity episodes not necessarily undertaken during the same occupation. This is an important point since multiple-event scatters are not equivalent on an analytical or interpretive level to artifact distributions resulting from single events or activities. Accordingly, understanding past use of landscapes on a regional scale requires that this distinction be made. Patterns like the ones above should be viewed as at least partial evidence for the differential use of site locations which are similarly classed as "scatters." The variable histories of large, high variety assemblages are addressed in the next section of this chapter.

Artifact scatters vary least with respect to jar proportions in assemblages (Table 7.3). Figure 7.3 indicates that jar sherd proportions in all three scatter groups are quite similar and tend to cluster above 75 percent. Assemblages from scatters with structures exhibit the lowest C.V. since most contain high proportions of jar sherds, though few are composed entirely of jar sherds. The occurrence of both bowls and jars at scatters with structures should be due to the wider range of activities undertaken at these places as well as to longer-term use of locations with structures. Scatters with structures are also the least variable of the three groups with respect to decorated jar sherd proportions (Table 7.4).

Table 7.3: .!ar Sherd Proportions in All-observed Inventories and Midden Samples

Site/Provenience Features	N	Mean Percent	C.V.	I. R.
Lithic/Ceramic Scatters	29	83.79	21.54	73.27 - 100.0
Scatters with Features	28	76.86	39.10	70.6 - 100.0
Scatters with Structures	22	82.75	11.50	75.35 - 91.22
Roomblocks	23	78.46	15.18	70.5 - 87.2
Rooms	5	49.52	67.16	18.1 -79.25
Middens	26	75.84	12.03	66.98 - 82.7

Table 7.4: Decorated Jar Sherd Proportions in All-observed Inventories and Midden Samples

Site/Provenience Features	N	Mean Percent	C.V.	I.R.
Lithic/Ceramic Scatters	24	74.49	36.59	61.67 - 100.0
Scatters with Features	19	58.70	57.18	50.00 - 100.0
Scatters with Structures	22	72.99	21.25	5.57 - 81.22
Roomblocks	23	67.13	25.56	55.4 -80.5
Rooms	5	67.32	67.16	14.1 -69.3
Middens	26	59.92	21.54	48.60 -68.97

Table 7.5 lists grayware proportions for artifact scatters. The mean and I.R. are almost identical for all scatter groups. These measures indicate that graywares occur at frequencies which are consistently much higher than brownwares in assemblages at artificat scatters. Half of the scatters without features and structures and those with features have utility ware assemblages composed entirely of graywares. Only about one quarter of the utility ware assemblages at artifact scatters associated with structures are entirely graywares.

The pattern noted by LeBlanc (1982:117-118) of an increase in brownwares through time is also evident in these structural assemblages

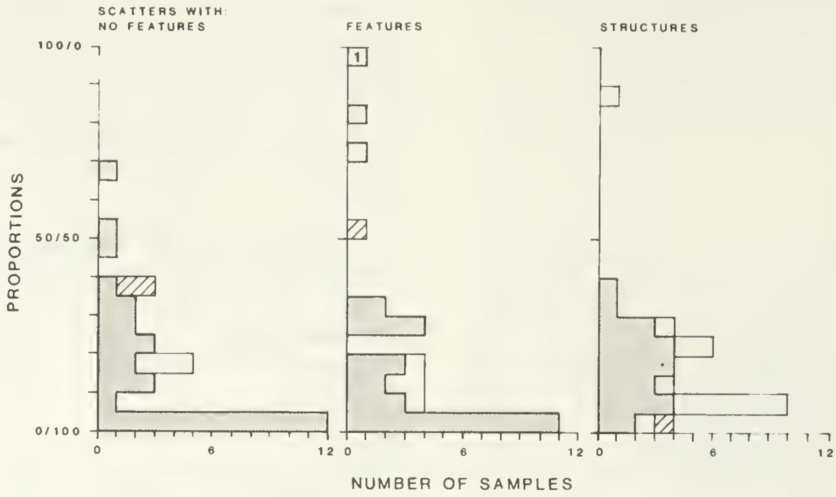


Figure 7.3: Bowl/jar sherd proportions in scatter assemblages.

with graywares averaging 86 percent in assemblages typologically assigned to Pueblo I-II, 74 percent to Pueblo II, and 35 percent to Pueblo II-III. As discussed in Chapter 5, however, not all later period assemblages contain high proportions of brownwares.

Table 7.5: Grayware Proportions in All-observed Inventories and Midden Samples

Site/Provenience Features	N	Mean Percent	C.V.	I.R.
Lithic/Ceramic Scatters	25	79.32	34.80	56.65 - 100.0
Scatters with Features	25	75.00	54.23	54.15 - 100.0
Scatters with Structures	22	75.39	42.95	51.45 - 100.0
Roomblocks	22	70.37	40.98	39.3 - 94.95
Rooms	5	67.32	48.94	36.95 - 100.0
Middens	26	55.80	45.55	6330- 74.17

The lower redware C.V. for scatters associated with structures (Table 7.6) is caused mainly by the fact that redwares occur in over half of these assemblages. The highest redware proportions occur at two of the three Pueblo II-III scatters in this sample.

Redwares are virtually absent at artifact scatters without structures and features and occur at only nine of the scatters associated with features.

Table 7.6: Redware Proportions in All-observed Inventories and Midden Samples

Site/Provenience Features	N	Mean Percent	C.V.	I.R.
Lithic/Ceramic Scatters	24	3.84	223.6	0- 2.9
Scatters with Features	19	14.35	184.1	0 -14.3
Scatters with Structures	22	10.00	149.0	0 -17.45
Roomblocks	23	23.71	81.5	0 -38.00
Rooms	5	47.98	80.9	13.4 -85.3
Middens	26	19.9	124.9	0 -38.02

➡ Roomblocks:

Twenty-three inventories of all-observed ceramics were obtained from roomblock surfaces. In contrast to artifact scatters with and without features, roomblock scatters exhibit lower utility ware proportions, averaging about 45 percent (Table 7.2 and Figure 7.4). The mean percentage of utility wares and the I.R. are quite similar to those of scatters with structures. Slightly more bowl sherds occur in roomblock scatters than in scatters associated with smaller structures (Table 7.3). Fewer graywares and more redwares also occur. This pattern is expected since most roomblocks represent later occupations and yield the highest redware counts.

Figure 7.4: Roomblock assemblages: a. decorated/utility ware sherd proportions, b. bowl/jar sherd proportions.

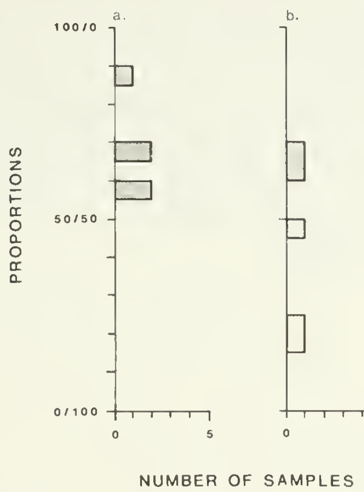


Figure 7.5: Room assemblages: a. decorated/utility ware sherd proportions, b. bowl/jar sherd proportions.

➡ Rooms:

An all-observed sherd inventory was obtained from each of five vandalized rooms within larger structures (Figure 7.5).

Since room inventories are from vandalized contexts, their representativeness of room contents in general can be questioned. The few number of examples in this group also make it difficult to assess patterns in room content. It is reassuring, however, that room inventories also exhibit the trends shown by roomblock assemblages.

Utility ware proportions fall well within the range of those for roomblocks, with grayware proportions slightly lower and redware proportions appreciably higher than those of roomblocks, although not significantly so (Tables 7.2 through 7.6). On the average fewer jar sherds also occur in rooms.

These patterns reinforce those exhibited by roomblock assemblages, i.e. fewer graywares, more redwares, and more bowls in assemblages in comparison to scatters, and indicate that roomblock surface scatters may be generally representative of room fill contents. Further work is needed to confirm this conclusion.

➡ Middens:

With one exception, middens were sampled with grids. Midden samples are characterized by an extremely tight clustering of utility ware and jar sherd proportions (Figure 7.6). The C.V. and I.R. for these measures indicate low variability (Tables 7.2-7.6) as well. Over half (58 percent) of these middens have been dated ceramically to the period A.D. 800 to 1100 and the rest to between A.D. 1050 and 1300.

Ford (see Chapter 5) attributes high bowl sherd frequencies in middens to the fact that later period occupations (those with middens) show a trend toward increased occurrence of White Mountain Redwares which are almost exclusively bowl forms.

While redware bowls are more frequent in middens and roomblocks of later occupations, this fact does not explain why jar sherd proportions from middens should exhibit a low C.V. If the occurrence of redwares is the reason for high bowl frequencies in assemblages, then roomblocks which average higher percentages of redwares than do middens (Table 7.6) should also average higher percentages of bowls; but this is not the case (Table 7.3). One reason for less intra-assemblage variability among midden samples may stem from repeti-

tive use of middens for dumping and the recycling of items such that there is a greater chance that middens in general will exhibit more regularity in the proportions of items they contain in comparison to other feature classes. In other words, like the scatters associated with structures discussed above, middens are a more intensively used, multiple event phenomena.

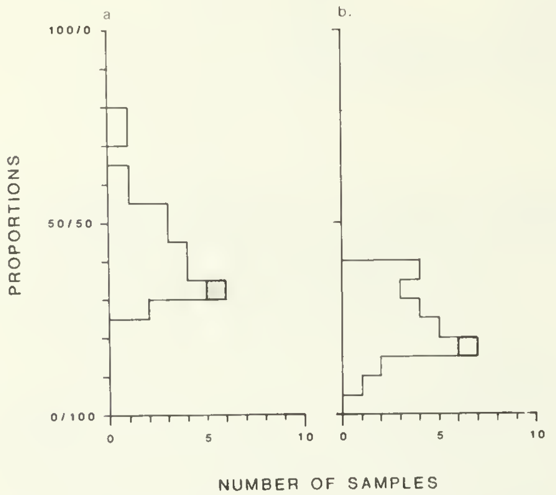


Figure 7.6. Midden samples: a. decorated/utility ware sherd proportions, b. bowl/jar sherd proportions.

Summary

Vessel form and ware proportions were compared for all site classes using a Wilcoxen two-sample test (two-tailed). Significant differences between site classes were judged to exist at a 0.05 probability level (Table 7.7). Greatest contrasts among site classes can be found between midden samples and scatter assemblages. On the basis of utility ware proportions alone, scatters without associated features and structures differ from midden samples--middens averaging highest utility ware proportions and artifact scatters the lowest. This indicates that there are a number of relatively small ceramic assemblages from nonstructural contexts with high proportions of decorated wares. Higher utility ware proportions also occur at middens than at roomblocks. Scatters of all types also differ from middens with respect to jar and decorated jar sherd proportions; the former contain significantly higher proportions of jars. A predominance of activities involving processing, caching, and storage with utility and decorated ware jars, and little use of serving containers (bowls) can be inferred for most scatters including those with structures. Of the structural assemblages, only rooms differ from scatters of all types with respect to jar sherd proportions; rooms yield more bowl than jar sherds.

Table 7.7: Significantly Different Site Class Combinations Based on Ware & Vessel Form Proportions

Utility Wares:	middens	*roomblocks
	middens	lithic/ceramic scatters
Jars:	middens	all scatter types(lithic/ceramic scatters*)
	rooms	all scatter types(scatters with structures*)
Decorated Jars:	middens	*lithic/ceramic scatters
	middens	*scatters with structures
	rooms	lithic/ceramic scatters
	rooms	*scatters with structures
Graywares:	middens	*all scatters
	middens	roomblocks
Redwares:	lithic/ceramic scatters	middens
		rooms
		*roomblocks
		scatters with structures
	rooms	scatters with structures

(p=0.05,* indicates p=0.01)

Middens differ from all scatter types in that grayware proportions are significantly lower than at scatters. This pattern can be linked with the late occurrence of brownwares in the region as represented by late period midden samples. However, grayware proportions are unexpectedly and significantly higher at roomblocks than at middens. Since roomblocks and midden inventories were taken from distributions each thought to represent late occupations, the period of occupation alone cannot be used to account for the occurrence of high brownware proportions at site locations in the Quemado region. These patterns will be further examined in the next section of this chapter.

Redware proportions at middens, rooms, roomblocks, and scatters associated with structures are all significantly higher than those at artifact scatters lacking structures and features. Rooms also have significantly higher redware proportions than scatters associated with structures. Ceramically defined temporal differences and redware proportions follow similar patterns.

This description has shown that the degree of difference among sites within each class varies among the functional site classes. Within three site classes, scatters with structures, roomblocks, and middens, the assemblages are more similar to each other than are those at scatters with and without features. Similarly, roomblock assemblages are less variable than are those at scatters with structures. There is also considerable overlap in the actual proportions of wares among site classes, which suggests that features and structures, or lack of them, at site locations may not be the optimum criteria on which to base functional analyses of sites.

In the following section of this chapter, site assemblages are examined from another perspective, using techniques that first establish groups of similar assemblages and then determine types of features, structures, and lithic assemblages characteristic of each group. In this way several independent lines of evidence, including the patterns of ceramic assemblage content demonstrated above, are used to inquire further into the cumulative histories and functions of site assemblages.

Lithic/Ceramic Assemblages and Site Occupational History

In this section, two lines of evidence have been pursued in order to explore the potential for variability in the functional and historical composition of site assemblages containing lithic and ceramic artifacts. First, a multivariate approach for grouping ceramic assemblages based on the five ware and vessel form proportions presented in the previous section was applied to all-observed inventories and to grid samples from middens. The goal was to define groups of ceramic assemblages with the least amount of internal variability with respect to the five ceramic attributes. Descriptions of each of the resulting assemblage groups identify types of features and architectural remains associated with ceramic ware and vessel form associations. Flake and tool attributes recorded in all-observed lithic inventories (100 percent of the lithic artifacts) from sites in each of these groups were examined. Analysis of flake attributes and indexes of tool, core, and flake types were used to ascertain whether strategies for production and maintenance of stone tools varied among ceramically grouped locations.

Types of features, architectural remains, and inferred tool production strategies suggest that patterned variability among lithic/ceramic assemblages in the Quemado area represents functionally distinct settlement components, which in turn can be viewed as parts of relatively sedentary systems.

Modeling Assemblage Content and Structure: Ethnographic Observations

Reuse of locations and facilities by a residential (consumer) group for similar functions is characteristic of settlement patterns in seasonally sedentary systems. Moore (1979) documents considerable reuse of fieldhouses and shelters among Southwestern Puebloan groups.

Ellis (1974b:16) maintains that less reuse is made at piñon camps since crops cannot always be expected in the same location from year to year. The increasing permanence of

the main residential base has been used to explain repetition in the use of particular places in such systems (Binford 1982:21).

Since the function or "economic potential" of a place varies with movement of the residential group, establishing a permanent residence results in stabilization of the economic potential of other use areas as well, e.g. fieldhouses. Reoccupation of locations for other kinds of subsistence activities has been described for relatively sedentary systems: saguaro cactus camps among the Papago (Underhill 1979:40); corral facilities among the Navajo; herding shelters among Keresan groups (Ellis 1974:175); and overnight camps used during salt-gathering expeditions by the Hopi (Titiev 1937:247).

Kelley's (1982:202-284) documentation of the reuse of winter residences, corral, sheep camps, and herding campsites by Navajo families near Gallup, New Mexico, indicates a period of use lasting over 30 years for several types of seasonal occupations. Anderson (see Camilli 1983:65-67) has recorded similar reuse patterns among Navajo families living on Black Mesa in northeastern Arizona. Summer/fall and winter/spring residential sheep camps are located in the same place for periods as long as 35 years in this area.

Reuse of seasonal camps that are essentially residential in nature may result in relatively heterogeneous assemblages of tools and debris generated during routine domestic maintenance tasks. Although some bias may exist at these places toward seasonal equipment, the variety of domestic maintenance gear at seasonal camps may be relatively similar to that which is produced and discarded at more permanent habitations. The activities undertaken at Navajo agricultural fieldhouse and piñon campsites have been described as primarily social, domestic, and recreational. Powell (1980:155) states that the activities carried out at such campsites include a variety of domestic activities, such as food storage, preparation, and consumption, child care, sleeping, and tool maintenance.

Comparison of Navajo agricultural field camps with piñon camps indicates a similar frequency and range of artifact types, most of which are used during domestic activities like these (Blomberg 1979). Blomberg (1979:20) maintains that "an equal probability for the discard of domestic activity-related artifacts exists regardless of the season." This observation has recently been made by Sebastian (1983:406) in arguing for similarity among residential ceramic assemblages generated at fieldhouses and more permanent habitations. If domestic activity-related artifacts are produced and discarded in a similar manner at seasonal and permanent residences, given occupation through an entire season and the redundant nature of domestic activities, maximum assemblage diversity should be obtained at some point in a season or period of use at temporary and more permanent residences.

Although tools and debris may be generated continually during the occupation, the types generated would eventually recur, reinforcing the range of types already present. A tool diversity threshold can thus be expected for residential assemblages at which point assemblage size would continue to grow; however, the range of tool types would remain constant.

Heterogeneity in assemblage content is not an exclusive property of residential assemblages. The potential for differences in the use histories of places may result in the generation of assemblages at some sites which will be much more complex than at others. Reuse of locations for functionally different purposes could result in a direct relationship between assemblage size and tool variety, more frequently reused areas containing more items of different types. This set of circumstances has been termed a "growth in size: increase-in-diversity" model of occupational history (see Chapter 6).

In more mobile contexts, variability among assemblages at residential camps could be responsive to major changes in subsistence activities at different times of the year (Binford 1978:491). Major differences in group size and camp duration, as expressed in the number of consumer days of occupation, could also produce variability among residential camp assemblages. In general, assemblages at short-term residential camps where foraged

resources are introduced should increase in variety and size with longer occupations. In contrast, it has been argued (Binford 1979; Camilli 1983:57-58) that nonresidential assemblages, those resulting from the use of locations by producer groups organized in a logistical fashion, do not necessarily increase in variety with larger assemblage size.

Assemblages produced during task-specific activities should also represent the technological strategy carried out at special-purpose camps in a more direct manner than at residential assemblages, due to two factors. First, activities associated with special-purpose occupations represent a segment of a resource procurement continuum.

For example, hunting stands and kill and processing sites are all occupied for the purpose of game procurement with a different aspect of the procurement strategy represented at each place. Second, the amount of time each place is occupied is relatively short when compared to the amount of time required to perform the entire continuum of procurement activities.

Translating these ideas into expectations for tool assemblages suggests that tool maintenance should be more directly represented by assemblage content at some places, raw material procurement and tool production at others. In comparison, tool production and repair is an ongoing process at residences, so while debris from these activities is present at residences no single aspect of the technology should be any more heavily represented than another.

Analysis of Lithic/Ceramic Assemblages

There are 137 ceramic assemblages for which 100 percent of the sherds at site locations in the Moderate Production Area were recorded. Proportions of sherds in five ware and vessel form categories (utility ware, grayware, redware, and decorated jar and all jar sherds) were calculated for each sample and a hierarchical cluster analysis performed using the average linkage method (Sokal and Sneath 1963:182-185). The cluster analysis defines morphologically similar samples based on these proportions. Using the average linkage method, the distance between any two clusters is calculated as the average squared Euclidean distance between all pairs of observations, consisting of one observation from both clusters (Sarle 1982:423; Sokal and Sneath 1976:184). Euclidean distance is measured as the sum of the squared distance across the five proportions. This analysis, thus, enables comparison of ceramic assemblage composition among surface distributions associated with different features, no structures.

The numerical index used to aid in the determination of the number of clusters is an approximation to the expected value of the within-cluster sum of squares and is called the cubic clustering criterion (CCC) (Sarle 1982:419-420). Using the CCC to delimit the number of clusters resulted in the grouping of the sample into 16 clusters; five clusters contained only one sample each. The rare occurrences of bowl sherds of various wares alone or in combination with whiteware or grayware jars in low frequency samples is responsible for these few outlying clusters.

Cluster Descriptions

As reported by Sebastian (1983:408) for Puebloan sites in the north-central San Juan Basin recorded by the Navajo Mine Archeological Program (NMAP), the cluster analysis segregated samples into jar-dominant assemblages and those with relatively high proportions of bowl sherds, argued by Sebastian to represent domestic assemblages based on an equation of the number of bowls with meal preparation and consumption at residences. The SACA analysis also defined a small set of assemblages dominated by bowls of various wares. This result is not necessarily in contrast to Sebastian's data set since she notes, but does not present data for, exceptions to the average of 40 percent decorated bowls at NMAP sites.

Hogan (1985:166) described a bimodal distribution for bowl percentages at Puebloan sites in the Hubbell Draw area that peaked at 10 to 14 and at 25 to 29 percent bowls. Based on this distribution, two "site categories" were defined: those with less than 20 percent bowls corresponding to Sebastian's jar-dominant assemblages and those with greater than 20 per-

cent bowls representing "normal" or domestic assemblages as defined by Sebastian (1983). Pairing these categories with features and architecture, Hogan (1985:163-164) posits functional categories of Puebloan sites in the Hubbell Draw area ranging from day-use field locations and facilities to fieldhouse/camps and seasonal and permanent habitations. Similar associations of assemblage types and features were identified in the Moderate Production Area survey data and are presented below.

Cluster interpretations describe ware, jar, and bowl proportions and feature and architectural types associated with ceramic assemblage groups. Average ware and vessel form proportions are listed for each of 16 clusters of site assemblages (Table 7.8). Percentages of jar sherds average greater than 60 percent for all but the smallest clusters, i.e. those with low frequency samples. Utility ware proportions vary more radically, however. Small clusters containing low frequency samples vary from those composed entirely of decorated wares to those containing only utility wares. Larger assemblages tend to contain at least 40 percent decorated wares. These patterns correspond remarkably well with types of features and structures associated with samples in each cluster (Table 7.9).

Table 7.8: Mean Ware and Vessel Form Proportion by Cluster

Cluster	Mean Proportions				
	Grayware	Jars	Dec. Jars	Redware	Utility Ware
1 n=6	0.00	0.92	0.92	0.02	0.00
2 n=2	0.00	0.00	0.00	0.00	1.00
3 n=19	0.81	0.94	0.93	0.01	0.36
4 n=11	0.91	0.97	0.00	0.00	0.99
5 n=2	0.00	1.00	0.00	0.00	1.00
6 n=41	0.93	0.85	0.68	0.05	0.57
7 n=17	0.41	0.77	0:71	0.04	0.60
8 n=15	0.76	0.70	0.54	0.36	0.44
9 n=14	0.22	0.66	0.57	0.41	0.39
10 n=2	0.00	0.37	0.37	0.47	0.00
11 n=3	1.00	0.59	0.14	0.05	0.52
12 n=1	0.33	0.20	0.00	0.00	0.60
13 n=1	1.00	0.00	0.00	1.00	0.33
14 n=1	1.00	0.36	0.28	0.71	0.11
15 n=1	0.00	0.00	0.00	1.00	0.00
16 n=1	0.00	0.29	1.00	0.00	0.71

➡Cluster 1:

Assemblages in this cluster are composed almost entirely of decorated whiteware jar sherds, redwares occurring in one case. No utility wares are present in these samples. All were recorded at lithic/ceramic or ceramic scatters two of which also contained FCR. A rubble feature was also recorded at one of the scatters containing FCR.

➡Cluster 2:

Both sites in this cluster are lithic/ceramic scatters associated with rubble features one of which also included FCR. The assemblages are composed entirely of brownware bowls.

➡Cluster 3:

Decorated whiteware jars dominate in ceramic assemblages in this cluster with utility wares occurring in low proportions. Most utility wares present are grayware jars. Approximately half of the assemblages were recorded at lithic/ceramic scatters, while the other half have structural associations.

Construction techniques and elements are varied: a pitstructure, basalt cobble foundation outlines, basalt or sandstone block simple masonry, and simple masonry incorporating jacal elements were observed in association with surface scatters.

Table 7.9: Cluster Descriptions

Cluster	Dominant Ceramics	Dominant Features
1 n=6	decorated whiteware jars	scatters with and without FCR
2 n=2	brownware bowls	rubble features
3 n=19	decorated whiteware jars; low utility ware proportions dominated by grayware jars	artifact scatters with and without small structures (5 rooms average)
4 n=11	grayware jars	artifact scatters with and without hearths, ash, and FCR
5 n=2	brownware jars	artifact scatters with and without ash and FCR
6 n=41	30% decorated whiteware bowls and grayware jars; few redwares and brownwares	artifact scatters associated with rubble features and small structures (4 rooms average)
7 n=17	30% decorated whiteware bowls and brownware jars; few redwares and fewer graywares than brownwares	artifact scatters associated with small structures (8 rooms average)
8 n=15	decorated whiteware bowls and jars in equal proportions; redware bowls; grayware jars	roomblocks and midden samples (13 rooms average)
9 n=14	decorated whiteware bowls and jars in equal proportions; high redware bowl proportions; brownware jars	roomblocks and midden sample (21 rooms average)
10 n=2	redware bowls; decorated whiteware bowls and jars	artifact scatter; small structure
11 n=3	whiteware bowls and grayware jars	artifact scatters
12 n=1	brownware and whiteware bowls	artifact scatter
13 n=1	redware and grayware bowls	room sample
14 n=1	redware bowls; grayware jars	room sample
15 n=1	redware bowls	artifact scatter w/ash; FCR
16 n=1	brownware bowls; whiteware jar	artifact scatter w/ash; FCR

A midden deposit was identified in only one case, in all other cases the surface distribution fell into a "refuse scatter" category.

The estimated room count for structures ranges from one to seven rooms and 15 rooms for the structure associated with the single identified midden.

➡Cluster 4:

This cluster is the most ceramically uniform, composed entirely of grayware jar assemblages. Hearths or ash/FCR scatters are present at a majority of the proveniences.

➡Cluster 5:

Each of the two assemblages in this cluster contains only brownware jars. Ash and FCR are present at one site.

➡Cluster 6:

Assemblages in Cluster 6 are dominated by whiteware and grayware jars with decorated bowls making up about 30 percent of the decorated ware assemblage. Utility wares (graywares) form slightly more than half of these inventories. A few assemblages also contain very small proportions of redwares. This cluster is the most varied architecturally.

Surface distributions lacking associated features or structures yielded nine assemblages. Locations containing features which include rock art, hearths, rubble features, or ash and FCR are represented by eight site assemblages. Two assemblages were recorded at a surface distribution covering 11 pitstructures and an associated midden.

The remaining samples were recorded at structural proveniences from surface distributions perceived as scatters rather than as middens, with only one exception. Foundations of one to six rooms in size were recorded at nine sites. Basalt cobble or block and sandstone block, slab, or masonry comprise the foundation materials. Sandstone or basalt block and basalt cobble simple masonry characterizes two- to five-room structures in the case of 10 sites.

Assemblages from two compound masonry structures of 11 and 13 rooms are included in this cluster as is the single midden sample associated with a four-room core/veneer masonry structure.

➡Cluster 7:

Ceramic assemblages at sites in Cluster 7 correspond to those in Cluster 6 with the exception that brownwares rather than graywares make up a majority of utility wares in the assemblages. All but two of these assemblages were recorded at middens, roomblocks, or scatters associated with structures. Associated architecture consists for the most part of simple masonry structures from two to 14 rooms in size.

➡Cluster 8:

Decorated jars and bowls occur in almost equal proportions in assemblages in Cluster 8 and overall utility ware proportions are low in comparison to those in Clusters 4 through 7. Graywares dominate utility ware assemblages at sites in this group and redware proportions are moderately high. These assemblages were recorded at roomblocks, middens, and scatters associated with structures. Associated structures consist of simple, compound, and core-veneer masonry structures of from two to 38 rooms. Construction elements are varied and include basalt cobble or block and sandstone slab or block.

➡Cluster 9:

Assemblages in Cluster 9 correspond to those described for Cluster 8 with the exception that brownwares constitute a majority of the utility wares. Redware proportions are the largest of any assemblage group. Features and structures include a lithic/ceramic scatter with associated ash and FCR concentrations and roomblock and midden samples.

In contrast to sites in Cluster 8, architectural remains are those from simple masonry structures of from four to 45 rooms, perhaps indicating slightly more rooms per structure and different construction techniques associated with structural assemblages having high proportions of brownwares and bowls. A single adobe/jacal roomblock also occurs in this cluster. Construction elements include basalt cobble and block, sandstone slab, and block and masonry/jacal for other structures.

Differences between sites in Clusters 8 and 9 do not include period of occupation as defined by ceramic types present in assemblages. Equal numbers of sites dated to Occupation Period 3 from A.D. 1050 to 1350 occur in each cluster. In comparing sites from different periods, Ford (Chapter 5) presents similar findings.

➡Clusters 10 - 16:

Most of the remaining clusters consist primarily of bowl sherds from single or a very small number of vessels and some jar sherds. Associated features and structures vary. Similar to findings in the previous section redwares dominate assemblages from the two rooms in this group.

Summary

Table 7.9 summarizes the patterns presented by the cluster analysis. The major patterns are as follows:

1. The association of utility ware jars (Clusters 4 and 5) with nonstructural scatters.

2. Assemblages dominated by whiteware jars (Cluster 1) at nonstructural scatters.

3. Whiteware jars and very low utility ware proportions (Cluster 3) at nonstructural scatters and small structures.

4. Assemblages with about 60 percent utility wares and 30 percent whiteware bowl sherds (Clusters 6 and 7) at small to moderate-sized structures and some scatters.

5. Decorated jar and bowl sherds in roughly equal proportions, with utility wares making up less than half of the assemblage (Clusters 8 and 9) at moderate to large structures.

6. Small assemblages composed exclusively or primarily of bowl sherds (Clusters 2, 10-16) at scatters, rooms, and a small structure.

The first four patterns apply to assemblages from sites assigned to Occupation Periods 1 and 2 from about A.D. 800 to 1100. The fifth pattern applies to Occupation Period 3 (A.D. 1050 to 1350) assemblages and all occupation periods contribute assemblages to the sixth pattern. Thus, redwares segregate typologically later assemblages in Clusters 8 and 9 with the added result that average utility ware proportions are lower and bowl sherd proportions higher (in part due to higher redware frequencies) in assemblages in these clusters. With very few exceptions, Occupation Period 3 assemblages (typologically defined in Chapter 5) do not occur in Clusters 1 through 7.

At this point, we cannot conclude that pattern 1-4 assemblages are "characteristic" of earlier and pattern 5 assemblages of later occupations in the area; first, because the full range of assemblage types from any one time span may not be represented in the six percent inventory sample of the Moderate Production Area. More importantly, though, is the fact that the equation of past settlement components with archeological sites and assemblages cannot be made without understanding the diverse use histories of these places. Identifying those sites in all clusters with similar cumulative histories will be attempted in the following section.

Flake Assemblages at Clustered Locations

This section presents evidence for differences in tool production and maintenance among lithic/ceramic sites. Morphological attributes of flakes and ratios of tool, flake, and debris types are compared among assemblages that have been grouped by the above cluster analysis. With some qualifications (see Chapter 6), flake attributes can be used to infer lithic reduction stage and variability among locations in the form of core materials from which flakes are produced. Ratios of tool, flake, and debris types gauge the contribution of different aspects of overall lithic manufacturing and tool use strategies to assemblages, providing an additional line of inquiry into technological variability among sites.

The three flake attributes compared among clusters are percent dorsal cortex cover, dorsal scar count, and platform morphology (see Appendix 4 for descriptions of recording procedures and definitions of each). The percentage of cortex cover on the dorsal surface of flakes is analyzed in four categories: none, 1-50 percent, 51-99 percent, and 100 percent. The number of scars on the dorsal flake surface representing previous flake removal was classed into three groups: 0-1 scar, 2-3 scars, and 4 or more scars. Flake platform characteristics compared include presence of a cortical platform, a smooth, noncortical single-facet platform indicating decortication of the striking platform surface, and a noncortical multifacet platform indicating previous flake removal from the striking platform surface and/or preparation of the striking platform for flake removal. Tool and debris ratios compared include five indexes: flake/core, tertiary flake, angular debris, utilized flake, and a formal tool index. The relative contribution of flakes and cores to assemblages was measured by the flake/core index obtained by dividing the number of flakes present by the number of flakes and cores in an assemblage. Lower measures of the index represent greater proportions of cores at locations. The proportion of flakes classed as biface thinning and pressure flakes (see Appendix 4) in the entire flake assemblage is the tertiary flake index. The angular debris index was obtained by dividing the frequency of angular debris by a

combined total of complete and fragmentary flakes and angular debris. The contribution of unifaces, bifaces, and projectile points to the tool assemblages was measured by a formal tool index obtained by dividing the number of facially flaked implements (unifaces and bifaces) by the total number of tools (including cores and hammerstones).

Cluster Descriptions

Lithic assemblages at sites clustered on the basis of ceramic content are described by averaging flake attribute proportions and technological indexes of the sites in each cluster group. Several of the clusters have been combined to obtain a higher number of sites in the groups compared (Tables 7.10 and 7.11). Combined clusters are essentially similar on the basis of proportions of utility and decorated wares and jar and bowl sherds but differ with respect to whether graywares or brownwares have dominant frequencies in utility ware assemblages. Combined clusters include 4 and 5 as one group, 8 and 9 as another, and all small clusters dominated by bowl sherds (2, 10, 11, 12, 15, and 16) as a third. Room inventories from sites in Clusters 13 and 14 were not examined. Flake attribute percentages and technological indexes presented have been averaged for assemblages in each group, thus controlling for variation in overall assemblage size among locations so that no one large assemblage is responsible for flake attribute values. The flake attribute values of all whole flakes recorded in the Moderate Production Area have also been averaged and are listed in Table 7.10 along with averaged values for site groups.

Table 7.10: Averaged Reduction Stage Data for Clustered Proveniences

Cluster		Percent Cortex				Dorsal Scars			Platform		
		0	1-50	51-99	100	0-1	2-3	4+	cort.	single facet	mult. facet
1	n=5	.47	.30	.16	.06	.19	.55	.26	.17	.44	--
3	n=8	.45	.27	.19	.08	.18	.39	.43	.23	.52	.01
4 + 5	n=9	.68	.15	.11	.15	.29	.34	.38	.08	.20	.20
6	n=19	.42	.28	.18	.10	.32	.31	.40	.21	.51	.07
7	n=10	.47	.29	.10	.12	.30	.22	.45	.18	.51	.07
8 + 9	n=6	.38	.35	.24	.04	.13	.43	.44	.34	.53	.05
2,10,11, 12,15,16	n=5	.67	.21	.09	.06	.20	.29	.52	.07	.51	.36
All Flakes		.51	.27	.13	.08	.24	.38	.38	.18	.54	.12

Table 7.11: Averaged Technological Indexes for Clustered Proveniences

Cluster		Flake/ Core Index	Tertiary Flake Index	Angular Debris Index	Utilized Flake Index	Formal Tool Index
1	n=5	.93	.03	.25	.01	.92
3	n=8	.86	.01	.23	.03	.71
4 + 5	n=9	.80	.07	.18	.13	.42
6	n=19	.88	.02	.25	.09	.46
7	n=10	.81	.04	.28	.07	.76
8 + 9	n=7	.85	.04	.23	.07	.50
2,10,11, 12,15,16	n=5	.97	.15	.24	.07	.17

➡ **Cluster 1:**

Cluster 1, the whiteware jar group, contains flake assemblages with moderate amounts of cortical material; flake proportions in cortex categories have middle values when all clusters are compared. The highest numbers of flakes occur in the 2-3 dorsal scar category, higher than any other cluster, while low to moderate numbers of flakes were recorded in the 0-1 and 4+ categories.

Flake platforms are distributed between the cortical and single-facet categories with moderate percentages of both in comparison to other clusters. Flake production using cores which were partially to wholly decorticated may be responsible for these patterns.

➡ **Cluster 3:**

Moderately high numbers of flakes with 51-99 percent dorsal cortex and cortical platform distinguish this cluster which is also distinguished by whiteware jars and low numbers of utility wares. These measures indicate early stages of lithic manufacture; however, most flakes are included in the high scar count category as well.

Taken together, flake attributes indicate variable production strategies (from use of raw materials to decorticated cores) for flakes at locations in this cluster with some emphasis on decortication of raw materials. Few flakes in the multifacet category and a low tertiary flake index suggest little platform preparation and/or manufacture of facially flaked implements.

➡ **Clusters 4 and 5:**

Nonstructural scatters containing utility ware jars comprise sites in these clusters. This group is distinctive in that the highest proportions of flakes occur in attribute categories suggesting late stage flake production and maintenance and production of facially flaked implements. More flakes occur in the 0 percent cortex category than in others and flake proportions in the multifacet category are high.

A relatively high tertiary flake index and low angular debris index also point to late stage manufacturing activities (e.g. Nelson and Camilli 1984). Few cores and formal tools are present in assemblages, possibly indicating tool recycling and the curation of tools in personal tool kits. In this situation, tools and cores are carried and used between special-purpose camps with exhausted and recyclable items returned to a home base for refurbishing or replacement.

➡ **Cluster 6 and 7:**

These clusters were not combined for analysis, but are so similar that they are described together. Clusters 6 and 7 include scatters and small to moderate-sized structures with about 30 percent decorated bowls and slightly more utility wares than decorated wares. The values of flake attributes in cortex and scar count classes are moderate when compared to those of other clusters with a majority of flakes in classes with less than 50 percent cortex and two or more scars.

Flake proportions in the multifacet category represent a moderate value. Moderate amounts of cortex present on flakes is coupled with relatively high dorsal counts. These patterns suggest that all stages of lithic manufacture are represented, although the focus seems to be on flake production from partially decorticated core material.

➡ **Clusters 8 and 9:**

The presence of roomblock and midden samples in these clusters may be responsible for a distribution of flakes among attribute classes that is inconsistent for representing a single reduction stage. Lowest percentages occur in the 0 percent cortex category and little late stage reduction is indicated by few multifacet platforms and a high proportion of cortical platforms. One would suspect, therefore, emphasis on early stage reduction; however, decortication flakes (those with 100 percent cortex) and flakes with one or no scars are relatively few in assemblages. A mix of production strategies is probably represented here with most flakes produced after core material has been decorticated.

A larger number of attribute-coded inventories are needed from roomblocks and middens in order to compare these two feature types and to determine consistent patterning in flake morphology.

➡Clusters 2, 10, 11, 12, and 15 (Bowl Assemblages):

The distribution of flake attributes from these assemblages is comparable to that of Clusters 4 and 5. The highest percentages of flakes occur in noncortical, high scar count, and multifacet platform categories. The tertiary flake index is also quite high and formal tools are few in these assemblages. Patterns are represented by a small number of assemblages--one problem with a small number of cases in any analytical grouping is the possibility that a single assemblage with a high proportion of late stage reduction flakes can determine the patterning in grouped assemblage content. This possibility has been controlled for, however, by standardizing assemblage counts using flake proportions from individual assemblages rather than by combining counts and then calculating flake percentages in each attribute class.

With this method high averages indicate that all cases contribute late stage reduction flakes to the proportions in Tables 7.10 and 7.11, and suggest that late stage tool production and maintenance was the primary manufacturing activity at locations in this group. More examples are needed to understand the variability in ceramic and lithic content of low frequency-low density distributions with high percentages of bowl sherds.

Summary

Inferences concerning production stage made on the basis of flake attributes and technological indexes of clustered locations are reinforced by Larralde's (Chapter 6) findings for lithic assemblages associated with small structures, roomblocks, and middens. Comparison of these findings is useful for describing clustered assemblages and elaborating on the general categories of small structures and roomblocks.

Cluster 3 corresponds to Larralde's "Small Structure" category, although not all locations grouped in this cluster contain structural remains. "Small Structures" (one to four rooms) form an early reduction stage, high variability category as inferred from a wide range in flake size and a high proportion of cortical platforms. Common at small structure scatters were a high proportion of early stage flakes, i.e. flakes with two to three scars and cortical platforms. With the exception of projectile points, most tool types are commonly found at small structures with equal proportions of groundstone and informal and formal chipped stone tools.

Larralde's "Small Structure" category was also distinguished by quartzite as the dominant material type with chert and chalcedonies occurring in lesser amounts. Although average room count is a little higher (five rooms) for structures in Cluster 3, flake assemblage composition remains similar to that of "Small Structures." Course-grained volcanics and quartzites are the common material types in most assemblages in Cluster 3. Clusters 6 and 7 contain a number of locations that would qualify, based on room count, for inclusion in the "Small Structure" category and are similar to small structures on the basis of most flake attributes.

It should be noted, however, that low-to-moderate amounts of multifacet platforms occur in Cluster 6 and 7 assemblages, thus an inference of only early to middle stage reduction activities does not always apply to these assemblages.

Clusters 6, 7, 8, and 9 correspond for the most part to Larralde's roomblock category. Roomblocks were found to exhibit the least variability in flake length and thickness when compared with other provenience types with volcanics as the dominant source material. Roomblock assemblages were also found to represent a middle reduction stage, low variability category as inferred from a narrow flake size range, moderate amounts of cortical flakes, and flakes with moderately high dorsal scar counts.

"Middens" form a late stage, low variability category as inferred from the narrow flake size range, high frequencies of flakes with low percentages of dorsal cortex, and the presence of four or more flake scars. The inclusion of midden samples among the few examples in Clusters 8 and 9 may be responsible for the low proportions of flakes in the 100 percent cortex and 0-1 scar count classes in the averaged reduction stage data for this group.

Clusters 1, 4, and 5, and bowl sherd clusters (2, 10, 11, 12, 15, and 16) correspond to Larralde's "scatters" and "scatters with features" categories. The few cases in these clusters cannot be further subdivided into those with and without features without compromising statistical applications. Many are associated with ash, FCR, or formal hearths and correspond to "scatters with features" categories of all sizes. Larralde found scatter categories to be highly variable with respect to inferred reduction stage.

Clusters 4 and 5 and bowl sherd clusters form a subgroup of these locations with lithic assemblages that, while somewhat variable, reflect emphasis on late stage reduction including final production and maintenance of facially flaked tools. Fine-grained cryptocrystallines and quartzites are the main material types at these locations.

To further assess the above conclusions, the maximum thickness of all measurable flakes in clustered assemblages was examined by treating flakes from each cluster as a single assemblage. The distribution of flake thickness is listed in Table 7.12 for Clusters 4 and 5; Clusters 2, 10, 11, 12, 15, and 16; Clusters 3; Clusters 6 and 7; and Clusters 8 and 9. As the graphed data (Figure 7.7) indicate, the flakes in Clusters 4 and 5 and in Clusters 2, 10, 11, 12, 15, and 16 are the thinnest ones recorded. A high percentage of noncortical flakes and multifacet platforms in these assemblages is coupled with the high tertiary flake index, warranting an interpretation of late stage tool production and maintenance.

The distribution of flake thickness for Cluster 3 corresponds well with an interpretation of early and middle stage reduction activities; the peak at 19-20 mm represents early stage decortication flakes. These patterns indicate that a number of production strategies were implemented at sites in this group, but that reduction of partially or wholly cortical material is most common.

Clusters 6, 7, 8, and 9 are very similar to Cluster 3, but lack a high percentage of thick flakes. A very even distribution of flake thicknesses from 2 to 10 mm characterizes these assemblages.

Table 7.12: Distribution of Flake Thicknesses for Clustered Assemblages

Thickness (mm)	Cluster				
	4 + 5 n=55	2,10,11 12,15,16 n=34	3 n=156	6 + 7 n=188	8 + 9 n=66
1-2	.25	.26	.05	.06	.09
3-4	.35	.41	.15	.33	.24
5-6	.13	.09	.13	.15	.20
7-8	.02	--	.16	.19	.11
9-10	.05	.03	.12	.13	.20
11-12	.11	.09	.07	.07	.03
13-14	.04	--	.01	.02	.03
15-16	.02	.06	.05	.05	.05
17-18	--	--	.03	.04	.02
19-20	--	.06	.19	.02	.03
21-22	--	--	.02	.02	--
23-24	.02	--	--	--	.02
25-26	--	--	.01	.02	--
27-28	--	--	--	.01	--
29-30	.02	--	.01	.01	.01

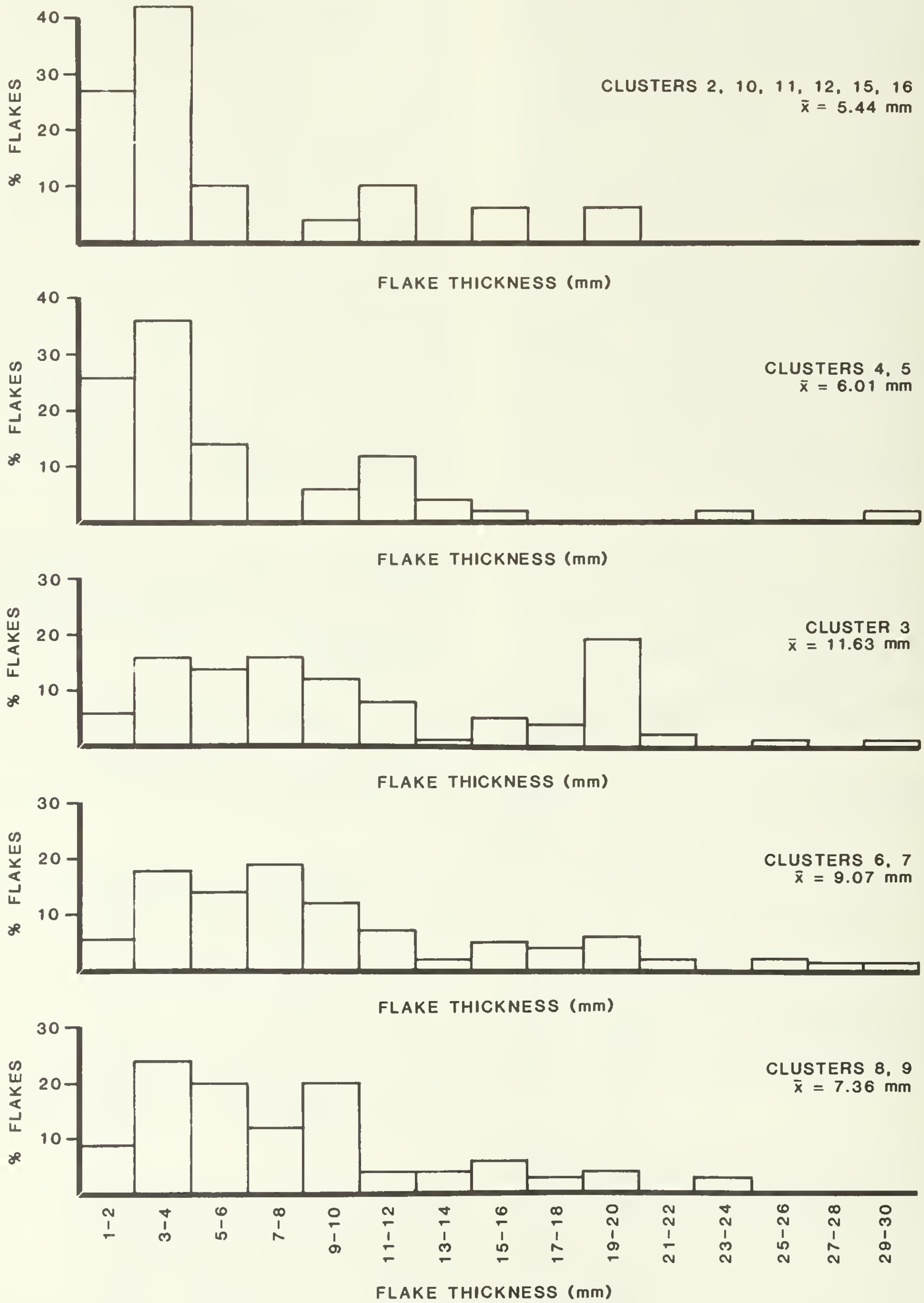


Figure 7.7: Distributions of flake thickness at clustered sites.

The lower mean thickness of flakes in assemblages at Clusters 8 and 9 compared to that of Clusters 3, 6, and 7 may indicate the prevalence of late reduction stage material at middens as demonstrated by Larralde for this group (see Lithic Narrative Data in Appendix 6).

Lithic Assemblages

The flake attributes of 25 lithic assemblages recorded (Table 7.13) have been analyzed as components of several provenience categories (see Chapter 6) and will not be further examined here. This section presents flake attribute data for each assemblage and a description of flake assemblage types at lithic scatters. Flake assemblage types are based on a hierarchical cluster analysis (Average Linkage Method) of the data presented in Table 7.13.

Four assemblages (sites 486-4, 492-1, 494-1, and 495-3) are characterized by high percentages of noncortical, multifacet platform flakes with dorsal scar counts of four or more. A second group of scatters includes moderate numbers of flakes in all cortex and scar count categories most of which have single facet platforms. Sites 245-1, 267-1, 268-4, 268-9, 451-1, 452-1, 459-1, and 495-1 comprise this group. The third group has four assemblages with flake percentages in attribute categories which are inconsistent for interpreting reduction stage, thus probably indicating a mix of production techniques. Flake assemblages in this group have highest percentages in the one to 50 percent dorsal cortex range, more than four dorsal scars, and cortical platform categories. Sites 243-1, 449-1, 488-1, and 495-2, the only attribute-recorded lithic scatter to yield a projectile point that could be classed as an Archaic type (see Table 5.17, Appendix 5), make up this group. The last group of four assemblages is characterized by moderate percentages of flakes in cortex categories under 100 percent, the 0-1 dorsal scar, and cortical platform category. These assemblages include those from 240-3, 249-1, 268-1, and 496-1. The other five lithic assemblages are highly variable with respect to all flake attribute categories.

Table 7.13: Flake Attributes in Lithic Assemblages

Site	Provenience	Sample	Percent Cortex 0	1-50	51-99	100	Dorsal Scars 0-1	2-3	4+	Platform Cort.	single facet	mult. facet
2	1	2	100.0	--	--	--	--	50.0	50.0	50.0	--	50.0
240	2	1	100.0	--	--	--	100.0	--	--	--	--	--
240	3	4	50.0	25.0	25.0	--	50.0	--	50.0	25.0	25.0	--
243	1	3	33.33	33.33	--	33.33	33.33	--	66.66	66.66	--	--
245	1	4	61.36	20.54	13.63	2.27	33.63	54.54	32.82	4.54	43.18	29.54
249	1	8	25.0	50.0	25.0	--	37.50	37.50	25.0	50.0	50.0	--
267	1	5	60.0	--	20.0	20.0	40.0	40.0	20.0	20.0	60.0	--
268	1	6	33.33	16.67	16.66	33.33	66.66	33.33	--	16.66	16.66	--
268	4	3	66.66	--	33.33	--	33.33	66.66	--	--	100.0	--
268	5	2	--	100.0	--	--	50.0	50.0	--	--	100.0	--
268	9	4	50.0	--	25.0	25.0	75.0	25.0	--	--	100.0	--
449	1	10	30.0	50.0	20.0	--	30.0	--	70.0	--	20.0	50.0
451	1	4	25.0	50.0	25.0	--	--	50.0	50.0	--	100.0	--
452	1	7	57.14	14.28	14.28	14.28	14.28	42.85	32.68	14.28	71.42	--
459	1	5	40.0	--	40.0	20.0	40.0	60.0	--	--	100.0	--
486	4	1	100.0	--	--	--	--	--	100.0	--	100.0	--
486	5	1	--	100.0	--	--	100.0	--	--	--	100.0	--
488	1	5	40.0	60.0	--	--	--	--	100.0	60.0	20.0	--
492	1	7	57.14	28.57	14.28	--	--	--	100.0	--	85.71	14.28
494	1	7	71.42	14.28	14.28	--	--	14.28	85.72	--	71.42	28.57
495	1	7	57.14	14.28	28.57	--	14.28	28.56	57.15	--	85.71	--
495	2	7	42.85	42.85	14.28	--	--	28.57	81.43	42.85	42.85	14.28
495	3	9	66.66	33.33	--	--	--	22.22	87.78	--	55.55	33.33
495	4	1	100.0	--	--	--	--	--	100.0	--	--	100.0
496	1	3	33.33	--	66.66	--	66.66	--	33.33	33.33	33.33	--

Implications for Site Use-History and Function

Models of residential and nonresidential assemblages presented at the beginning of this section addressed two aspects of assemblage content and structure expected to contrast locations with domestic functions and complex occupational histories and those with special-purpose functions. The ideas of assemblage specificity and heterogeneity were applied to residential and nonresidential assemblages and linked with characteristic relationships between item variety and the size of assemblages. These models will be reviewed below. Ceramic assemblage and flake attribute data from lithic/ceramic distributions in the Moderate Production Area will then be compared to modeled expectations. Models focus on permanent and seasonal residences and nonresidential or special-purpose locations in relatively sedentary systems.

Assemblage Models

Long-term residential assemblages were viewed as relatively heterogeneous, that is, containing a wide range of types in relatively even proportions, due to the accumulation of domestic debris throughout the period of occupation. The expectation was that domestic garbage would be quite redundant typologically for most discard events. With this model, assemblage variety (the number of different types of items forming assemblages) should vary among locations and be dependent on the length of time a residence was used. A variety threshold was anticipated for residential assemblages within a certain period of debris accumulation after which assemblage size would continue to increase and variety would not. Reused locations at which artifact distributions represent the debris from multiple overlapped events incorporating nonresidential activities were also expected to exhibit a degree of heterogeneity dependent on the intensity of reuse and functional variation among reuse episodes. In the case of composite distributions such as these, a direct relationship between assemblage variety and size was also posited.

In contrast, technologies in which activities are organized logistically, with tasks involving planned activities partitioned among different locations, were believed to result in more specific types of assemblages. Assemblage specificity was linked with the potential that assemblages resulting from specific tasks would more directly reflect tool production strategies than would those resulting from a range of production techniques. While planned resource procurement activities involving logistical considerations, i.e. specialized personnel and task localization, have been described as characteristic of mobile hunter-gatherer settlement systems (Binford 1980; Kelly 1983), logistically organized resource procurement trips could also be expected in more sedentary systems.

It could be argued that due to reliance on a relatively permanent home base, resources not available within a day's walk of the permanent residence must be obtained in an organized fashion. Such long-distance trips are described by Moore (1979) and reviewed by Sebastian (1983). For many agricultural practices — cultivation and surveillance of ripening crops — nonspecialized labor is used. The deployment of the labor force is organized around the growing season and the special needs of the fields. In the case of nonagricultural practices, such as hunting, resource procurement trips would also require planning, gearing up, and task partitioning among different locations with the degree of labor specialization dependent on the target resource. The extent to which logistic strategies like these dominate seasonal activities is related to the importance of a resource to technological and subsistence requirements. Not only will debris from agriculturally-related activities comprise the archeological record of Puebloan groups, there should also be some evidence of strategies by which relatively sedentary groups equip themselves for nonagricultural resource procurement in the archeological record of a region.

Ceramic & Lithic Assemblage Content

Ware and vessel form proportions are the most heterogeneous (exhibit the most even proportions of most wares and vessel forms) for ceramic assemblages recorded at surface scat-

ters on large roomblocks and middens (ceramic Clusters 8 and 9). Heterogeneity is somewhat less for assemblages recorded at surface scatters on and around smaller structures or features (Clusters 6 and 7) and lower yet for assemblages at the smallest structures or at nonstructural scatters (Cluster 3). The most specific ceramic assemblages, or those representing a single or few wares and dominated by a single vessel form come from nonstructural scatters (Clusters 1, 2, 4, 5, 10, 11, 12, 15, and 16).

Comparison of these assemblage groups to the Anasazi site functions posited by Sebastian (1983) for ceramic assemblages and associated features is instructive. Two major categories of ceramic assemblages were identified by Sebastian: those with jar-dominant decorated wares and those with 30 percent or more decorated bowls.

Within these two categories, the presence of associated features and structures was used to separate locations into categories of places used on a daily basis and for seasonal or year-round habitation. Daily use is thought to be represented by ephemeral shelters and little trash; continual use would be suggested by substantial structures, greater volumes of trash, and evidence of a wider variety of activities (Sebastian 1983:406). Hogan (1985:168) applies these categories to surveyed locations in the Hubbell Draw area using a cutoff of 20 percent bowls to separate jar-dominant and domestic assemblages.

The archeological manifestations of six major functional classes were defined by Hogan (1985:168) as follows:

1. Jar-dominated assemblages associated with small artifact scatters or scatters with hearths were interpreted as day-use field locations.

2. Jar-dominated assemblages associated with ephemeral structures, such as ramadas and single jacal rooms, were placed in the category of day-use field facilities.

3. Jar-dominated assemblages at the locations of one- to three-room structures with light to moderately dense surface scatters were give a storage function.

4. Domestic assemblages without associated structures were classed as fieldhouse/camps.

5. Fieldhouse/seasonal habitations include domestic assemblages associated with one- to three-room structures lacking dense middens.

6. The presence of structures larger than three rooms or one- to three-room structures with a midden deposit led to inclusion of these locations in a year-round habitation category.

With Moderate Production Area ceramic assemblages it is usually true that locations with the most substantial types of architecture (Clusters 8 and 9) have a higher proportion of decorated ceramics and bowls in assemblages than do other locations. The presence and substantiality of architectural remains is also correlated with the percentage of decorated bowls in most assemblages (see Clusters 1 and 3-9), except for those containing single or very few numbers of vessels. These results are not necessarily contrary to findings for NMAP sites (Sebastian 1983) which include lack of covariation between decorated wares and bowls, there are small decorated and utility ware assemblages made up entirely of bowls at nonstructural scatters. Decorated jar-dominant assemblages with low utility ware proportions also occur. Jar-dominant assemblages (utility ware and decorated ware) include Clusters 1, 3, 4, and 5.

Based on types of features and structures present and on bowl proportions, site clusters are compared with settlement category definitions (Table 7.14) as outlined by Hogan (1985). Table 7.14 is subdivided into jar-dominant assemblages; and those with relatively high proportions of bowl sherds (overall bowl sherd proportions exceed 15 percent and/or decorated bowl proportions exceed 30 percent). Inclusion in the decorated ware category requires that more than 40 percent of the assemblage consist of decorated wares. Because the presence of structures and fea-

tures varies among sites within each cluster, a single cluster can be assigned to several of Hogan's categories.

Table 7.14: Comparison of Ceramic Analysis Results with Settlement Categories Based on Bowl Proportions and Associated Architectural Remains

Settlement Categories*	Ceramic Cluster	
	Decorated Wares	Utility Wares
Jars		
Day-use field locations	1, 3	4, 5
Day-use field facilities	1, 3	4, 5
Storage facilities	3	
Bowls		
Fieldhouse/ camps	6, 7, 10, 11, 12, 15	16
Fieldhouse/ seasonal habitations	6, 7, 10	2
Year-round habitations	8, 9, 13, 14	

* Hogan 1985

This categorization can be assessed in light of flake and technological attribute data compiled for each cluster (Tables 7.10 and 7.11). In general, flake assemblages from locations in Clusters 1, 3, 6, 7, 8, and 9 (all those including but not limited to structural locations) were inferred to represent early-middle and middle reduction stages, while for Clusters 2, 4, 5, 10, 11, 12, 15, and 16 (including a structural assemblage in only one case) flake production occurs predominantly during middle and late reduction stages.

If all ceramic-bearing locations in the Moderate Production Area are considered related to agricultural activities (with day-use activities not necessarily centered around features or structures), one might not expect the second set of assemblages. This set of assemblages should be similar to assemblages at roomblocks, middens, and small structures; that is, flake attributes from assemblages in Clusters 10, 11, 12, and 15 should be similar to those in Clusters 6 and 7 (Hogan's fieldhouse category). Similarly, flake attributes in assemblages from Clusters 1, 3, 4, and 5 (jar-dominated assemblages) should be similar since all are assignable to a field location/facility category given Hogan's criteria. In fact, while somewhat more variable due to differences in length of occupation and place reuse, all nonstructural assemblages should resemble those at structural locations, if one views the range of artifacts discarded at field locations and facilities as "a microcosm of the domestic trash found on habitation sites and on fieldhouses occupied for the whole agricultural season" (Sebastian 1983:406).

In order to assess differences between flake assemblages from structural and nonstructural contexts, flake attributes were compared between assemblages in Clusters 4 and 5 and those in Clusters 6 and 7 (groups with the most inventoried assemblages). It was found that nonstructural scatters with grayware jars in Clusters 4 and 5 differed from nonstructural and structural scatters containing 30 percent decorated bowls in Clusters 6 and 7 with respect to flake thickness and platform morphology. Flake assemblages in Clusters 4 and 5 are composed of more thin, noncortical, multifacet platform flakes ($p=0.008$, $t=3.36$ for thickness; $p=0.021$ for noncortical flakes and $p=0.035$ for multifacet platform flakes with a Wilcoxen two-sample test with direction predicted).

These results suggest organizational differences in stone tool manufacturing and maintenance among ceramic-bearing locations and that the use of some of these locations may not have been related to agricultural activities. These findings also call into question assignment of sites to settlement categories based exclusively on jar proportions.

In addition, flakes in Clusters 4 and 5 have a mean flake thickness of 6.01 mm similar to that of Archaic-designated assemblages (mean=5.77) analyzed by Elyea (1985:63). Elyea (1985:62-64) makes a case for evidence of biface reduction as reflected by flake thickness, amounts of noncortical material and prepared platforms at Archaic sites in the Hubbell Draw area as opposed to core reduction at Puebloan sites.

Significant differences were demonstrated between analyzed Puebloan and Archaic assemblage groups in that "Archaic assemblages are composed of thinner flakes with more prepared platforms and less cortical materials than the Puebloan assemblages. Flake-size differences are also apparent in the continuous thickness variable in both the median and mean values..." (Elyea 1985:62).

The Moderate Production Area lithic data provide a contrast to this generalization, i.e. flakes consistently associated with utility ware jar assemblages fall within the range of variability exhibited by Elyea's Archaic assemblage group. Lithic/ceramic assemblages consistently associated with either utility ware jars (Clusters 4 and 5) or small numbers of bowls with and without jars (Clusters 2, 10, 11, 15, and 16) have high tertiary flake indexes indicating emphasis on formal tool manufacturing processes. On the other hand, the mean thicknesses of flakes from assemblages in structural clusters (Table 7.12) are similar to those presented for Elyea's Puebloan site types.

Several factors may be responsible for flake attribute patterns in the Hubbell Draw assemblages. First, flake size at Puebloan day-use sites in the Hubbell Draw sample (Elyea 1985:63) is radically different from that of Moderate Production Area nonstructural scatters with small, late stage reduction flakes, which, according to the site criteria outlined above, should be in a day-use category. This may mean that lithic/ceramic scatters of the types contributing to Clusters 2, 4, 5, 10, 12, 15, and 16 are few or lacking in the Hubbell Draw sample due to the differential topographic settings of the survey areas.

The SACA survey areas have considerably higher proportions of acreage in ridged uplands and, therefore, higher archeological visibility for small and moderate-sized scatters, due to their exposure on slopes and ridge tops, than do Fence Lake Coal Lease survey areas in the Hubbell Draw vicinity.

Second, by grouping flake attributes into site type categories for comparison, large assemblages with flakes produced during early and middle stages of the reduction process may contribute more materials to Elyea's comparison of sites than do smaller assemblages with flakes resulting from late stage reduction. The Hubbell Draw day-use category (less than 20 percent bowls and no structures) probably contains assemblages that would belong to Clusters 1 and 3 (jars and early and middle stage reduction flakes) as well as locations belonging to Clusters 4 and 5 (grayware jars and late reduction stage assemblages).

Combining of flake debris from both assemblage types may have resulted in the overshadowing of small assemblages with thin flakes by large assemblages with larger, thicker flakes. Given these circumstances, analyses would have to be particularly directed toward detecting patterns of association between utility ware jar assemblages or single bowl assemblages and formal tool manufacturing processes. In other words, if this association is not pursued, it will not be found.

On the basis of these observations, the value of formal tool manufacturing debris alone for diagnosing pre-ceramic occupations remains to be demonstrated. Further subdivision of the Archaic-diagnosed assemblages into residential and hunting stands would compound the problem. A standard typology for assigning locations to the functional categories of base camp versus hunting camp uses the presence of whole formal tools at the latter (Elyea 1985:69). In light of recent models of tool production strategies and studies of technological variation (Binford 1979; Camilli 1983; Camilli and Nelson 1983; Magne 1983; Pokotylo 1978) typological criteria should be reversed.

If residences are the sites of gearing-up activities including tool maintenance and recycled tool discard, these locations should contain formal tools and tool fragments as well as tool manufacturing and maintenance debris. In contrast, hunting camp assemblages should be dominated by maintenance debris and nonrecyclable tool fragments. Thus, typologies which rely on the presence of whole formal tools to indicate hunting camps may be in large part misidentifying at least one component of past settlement systems.

Assemblage Variety and Occupational History

Several models of the occupational history of places relating scatter size, assemblage variety, and tool frequency have been proposed in Chapter 6 and in this chapter. In Model 1, a growth-in-size:increase-in-diversity model, low diversity-low frequency scatters accrete into larger, diverse, high frequency scatters. With the "linear growth" model, Model 2, there is little change in the proportion of tools and debris between small scatters and large scatters. A third model could also be proposed. Model 3, a "growth-in-size:decrease in diversity" model, proposes that the highest assemblage frequencies correlate with the lowest diversities.

The processing of single products in a redundant fashion, possibly throughout a number of occupations in conjunction with tool recycling, may be responsible for a pattern in which few tools occur with large amounts of debris. With this model, continued or redundant use of a location contributes to assemblage specificity rather than heterogeneity. Several correspondences can be made when applying these models and expectations for residential and nonresidential assemblage content to lithic/ceramic assemblages from the Moderate Production Area.

Lithic assemblages from Clusters 1, 3, 6, 7, 8, and 9 may fit the linear growth model, that is, the proportion of tools to tools and debris is maintained from smaller- to larger-sized scatters, since large and small assemblages may be of similar functions. With redundant use of places for domestic purposes, assemblages would also achieve a variety threshold after a certain period of site use. Bowl proportions are low for Clusters 1 and 3 and high for the other clusters; all have relatively diverse flake assemblages representing early-middle and middle stage reduction sequences.

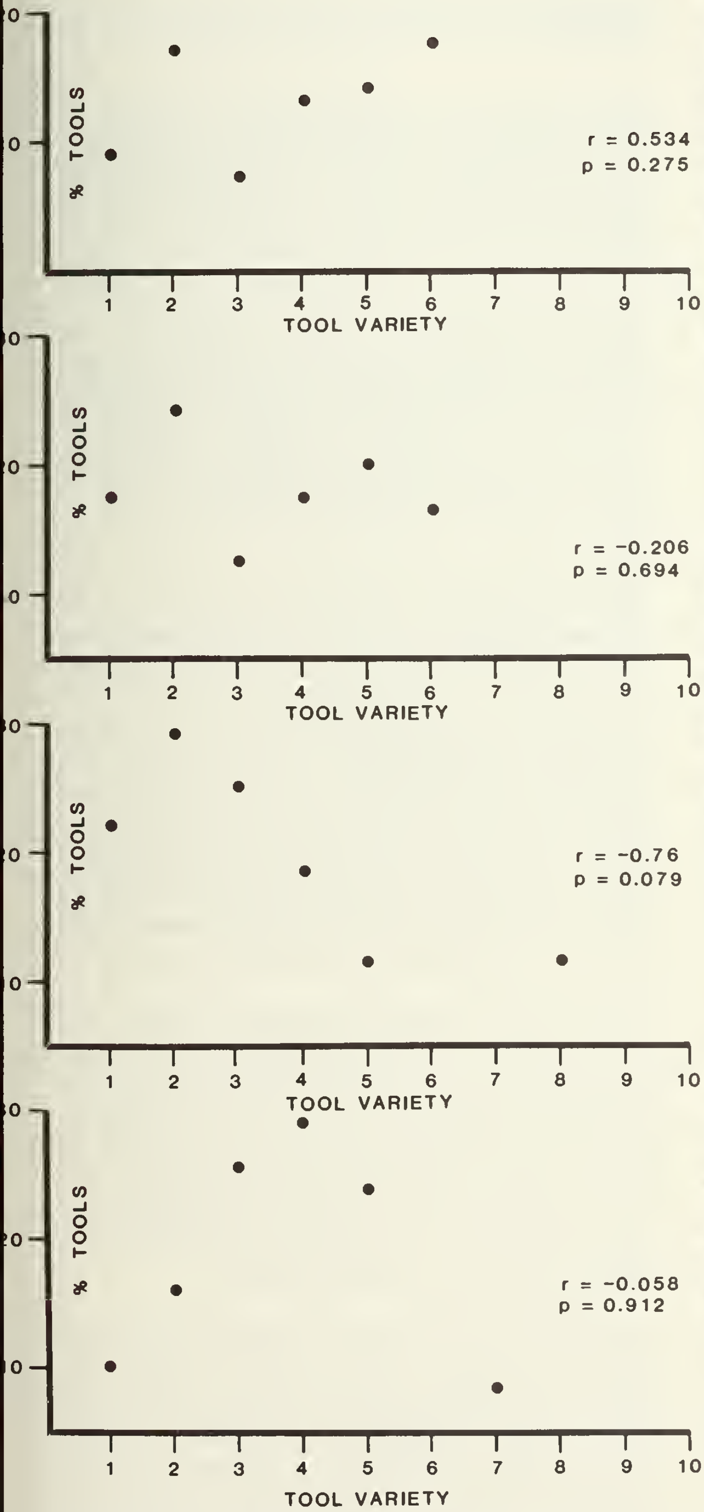
Assemblages in Clusters 1 and 3 correspond to Sebastian's (1983) "day-use" category and those in Clusters 6, 7, 8, and 9 are within the "fieldhouse/habitation" category. The assemblages should vary in size, but not in content, due to the presumed predominance of domestic-related activities.

Thirty-three assemblages from Clusters 1, 3, 6, 7, 8, and 9 were inspected for patterning in lithic assemblage variety, tool assemblage size, and total assemblage (tools and debris) size. Figure 7.8 illustrates the relationship between the average proportion of tools in assemblages and assemblage variety, (number of different types possible out of 11 types present in the assemblages). Tool proportions (tools/tools and debris) were averaged for assemblages with the same number of types and then graphed against the number of types present. Clusters 6, 7, 8, and 9 were first graphed separately (Figure 7.8a) and then with Clusters 1 and 3 (Figure 7.8b).

The graphs indicate slightly positive (Figure 7.8a) and erratic (Figure 7.8b) ratios of tools to total assemblage size with increases in variety. Although variety may be higher in the larger assemblages in these site groups, the proportions of tools and debris do remain relatively similar between small and large structural assemblages.

Assemblage variety also appears to threshold at about five types in larger assemblages. Given these patterns, an interpretation of the redundant use of places for domestic-related purposes would be warranted for assemblages in Clusters 1, 3, 6, 7, 8, and 9. The conclusion could also be drawn that, based on lithic assemblage content, low density scatters interpreted as briefly used agricultural locations and facilities host domestic activities similar to structural scatters — the locations of presumed permanent or seasonal habitation. Model 1 may apply to some assemblaes in this group as well. With this model, large scatters represent debris from multiple, functionally diverse occupations, and have a strong positive relationship between assemblage size and variety. This pattern is not strongly apparent however, possibly due to the prevalence of domestic-related activities at most of the sties studied here.

Sixteen assemblages in Clusters 2, 4, and 5 and 10, 11, 12, 15, and 16 fit Model 3 in which assemblages become more specific rather than heterogeneous with repeated or intensive use. Figure 7.8c illustrates that tool proportions and variety appear to be negatively correlated in these assemblages; that is, assemblages



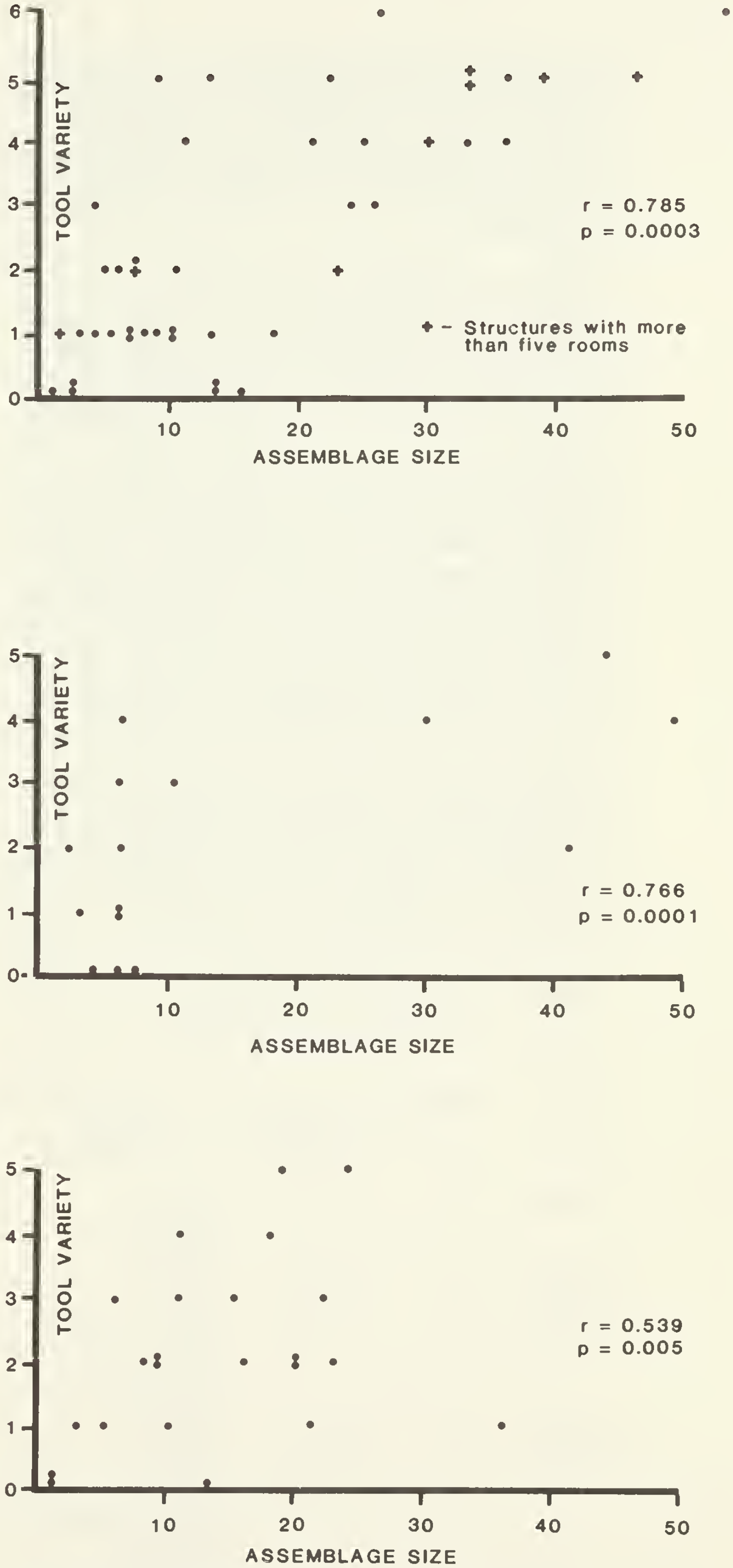


Figure 7.8: The relationship between tool proportion and tool variety for clustered assemblages: a. Clusters 6, 7, 8, and 9; b. Clusters 1, 3, 6, 7, 8, and 9; c. Clusters 4, 5, 10, 11, 12, 15, and 16; d. lithic scatters.

Figure 7.9: The relationship between assemblage size and tool variety for clustered assemblages: a. Clusters 1, 3, 6, 7, 8, and 9; b. Clusters 2, 4, 5, 10, 11, 12, 15, and 16; c. lithic scatters.

with high tool proportions have the lowest variety. Larger assemblages in this group are characterized by a positive relationship between variety and overall size (Figure 7.9b), but tool proportions are lowest in large assemblages.

Large assemblages that fit Model 3 should have the highest proportions of nonrecyclable tool fragments, since low tool proportions at large scatters should be caused by repeated "mining" of scatters for useable implements. Because only six assemblages contain formal tools (Table 7.15), it is not possible to conclusively demonstrate the differential occurrence of whole and broken tools at locations. Locations with high tool proportions do contain complete Biface types 1-3, while locations with lower tool proportions include a mix of whole and broken items. The variety of low tool proportion assemblages in this group may thus be partially accounted for by used, discarded tools. The reuse of places for similar nonresidential functions, during which implements from personal tool kits are maintained and recycled and previously deposited tools are "mined" from existing scatters, is suggested as responsible for this pattern.

Table 7.15: Whole and Broken Formal Tools in Model 3 Assemblages

Site	Variety	Tool Proportion	Tool Types Present
238/1	4	0.36	Biface 2 Biface 3
237/1	3	0.19	Biface 1
312/1	4	0.13	Biface 1
246/2	8	0.13	Biface 3, base Biface 3, midsection
237/1	5	0.11	Biface 1
241/1	4	0.07	Biface 3 Biface 3, tip & midsection Biface 3, broken tip

Consequently, assemblages represent a reliance on strategies for tool procurement, maintenance, and discard that may be redundant, but do not result in tool assemblages with high or even proportions of all types of implements.

To complete this analysis, lithic scatters were also examined for relationships between assemblage size and variety. No strong correlations between size and variety are evident among these diverse scatters (Figure 7.9c).

Tool proportions also vary erratically in relation to the number of types present in assemblages (Figure 7.8d); proportions are low for low- and high-variety scatters and highest for scatters of moderate variety. These patterns point to diverse occupational histories among lithic assemblages lacking ceramics.

Summary

The analysis presented here has concentrated on the archeological materials categorized into "functional" site groups and how these categories relate to patterns in the content of inventoried assemblages. Residential and nonresidential activities were seen as embedded in strategies for repositioning groups on a landscape, with the consequent conclusion that the occupational history of most places used in the past is complex rather than directly equatable with imagined activities.

Some of the strongest patterning in lithic and ceramic materials was exhibited by lithic assemblages composed of flakes produced during late stages of the reduction process, which are associated in a very consistent fashion with ceramic assemblages of exclusively grayware jars or predominately single bowls. There are a number of alternative interpretations of such associations.

Grayware jars may have functioned as cooking, food storage, water, and caching containers in nonresidential contexts, while lithic debris denotes ongoing maintenance of personal tool kits. Similarly, single bowls in such contexts may be those recycled from the household container inventory for use in the field.

Alternatively, the jar assemblage may indicate food preparation as a primary activity at nonstructural residences, with the same sites

reused in a nonresidential manner on separate occasions during which tool maintenance was the predominant activity.

Whichever interpretation may be correct, the consistent co-occurrence of grayware jars and late reduction stage flake assemblages does suggest that the same places were used repeatedly, whether or not ceramics and lithics were used concurrently.

To understand the use-histories of these places, more specific types of information must be brought to bear on questions concerning the use-history of such locations, i.e. data on jar form (seed jars or necked vessels) and vessel size, core reduction technique, feature content, and so on. In addition, a much larger inventory of cases is also required for study since all patterns demonstrated in this chapter rely on small numbers of cases from the six percent survey inventory.

The repetitive use of places for a wide range of domestic activities has been interpreted for heterogeneous ceramic and lithic assemblages. Patterns demonstrated include higher decorated ware and bowl proportions (independent of the type of utility ware) in larger assemblages associated with structures.

A difference between assemblages associated with larger structures is the association of core-veneer and compound masonry construction techniques with relatively high grayware proportions in contrast to the use of simple masonry construction at locations with higher brownware proportions. Simple masonry architecture and higher brownware frequencies may also be linked with slightly higher room counts. These patterns are based on 29 roomblock and midden samples (in Clusters 8 and 9).

The potential for reuse of places containing variable proportions of utility ware types has also been considered. The presence of late stage production debris as demonstrated for middens (Chapter 6) was suggested to indicate reuse of middens in nonresidential contexts. Nonresidential use and reuse of places might also be linked to alternative strategies for producing and using containers.

With a greater number of examples, utility ware assemblages could be compared with lithic assemblage data to pursue ideas about the reuse of locations that incorporate different ceramic technologies, building episodes, and tool requirements.

Chapter 8

Conclusions and Recommendations

The San Augustine Coal Area encompasses a distant watershed of the Little Colorado River, a landscape of open bottomlands and ridged uplands bordered by mesa scarps. Bureau of Land Management archeological surveys in the SACA Moderate Production Area were designed to provide reconnaissance level data concerning the location of large architectural sites and a sample inventory of site data which would provide information on the distribution and density of archeological remains in areas slated for inclusion in a federal coal leasing program.

General patterns of distribution for inventoried archeological remains consisting of 303 site proveniences, the smallest spatial unit recorded, are described in this report. The survey project also attempted to go further in describing the content of inventoried resources than is customarily accomplished with a standard site survey.

Documentation of project area artifact assemblages was also undertaken, including the in-field attribute coding of lithic and ceramic artifacts and architectural features, and was directed toward developing a data base which could contribute to explaining the complex use-histories of locations. In addition, in-field documentation of ceramics permitted an assessment of assemblage variability within the study area. A thorough review of the regional ceramic typology was presented in Chapter 5.

The relatively dense and complex nature of archeological remains documented by this project is indicative of repetitive, and to some extent, overlapping use of the area during the prehistoric occupation of the region. Intensive residential occupation is evident in the relatively high proportion, about 28 percent, of structural remains in the site inventory. Structural remains, attributed primarily to Pueblo I-II and Pueblo II periods, are densely distributed in the areas designated as topographic Zone C, ridge systems and low hills that separate major aggraded valleys. This zone comprises over half (about 63 percent) of the inventory area. The six percent, admittedly nonrandom, sample reported on here indicates a density of 84 site proveniences per square mile, a density that includes about 25 structures per square mile, in Zone C.

Given that this area hosted repeated residential occupation, analyses in this report have focused on modeling the occupational histories of places used in the past and identifying the associations of artifacts, features and structures that can result from different use-histories. These analyses are seen as a first step towards unraveling patterns of settlement and mobility that are commonly described with reference to archeological site distributions.

The view here was that reconstruction of settlement systems cannot rely on the direct equation of site location with settlement pattern. It held, rather, that archeological sites must be viewed as potential composites of debris from overlapped occupation of places. Accordingly, analyses have focused on a mid-

dle range inquiry into the mode of place reuse using several models of "site growth". This middle range level of analysis has sought to give meaning to archeological manifestations that have been uniformly recorded as "sites" before higher level theoretical inquiry into the nature of past systems is attempted.

Fieldwork organized around a coding system for general site and architectural attributes and for artifact type and attribute data has permitted examination of assemblage variability in the Quemado area. While more time consuming than procedures limited to narrative description of remains, in-field coding results in the recovery of architectural and artifact-specific data at the same time.

Coding consistency is facilitated by simultaneous training of a few expert personnel who then work together in the field recording artifact and other site characteristics within a short time frame. What is more, coding is accomplished during the course of the survey, insuring that upon completion of field work, pertinent data have been recovered and the need for extensive post-fieldwork analyses has been mitigated.

The data recovery effort is not limited to a few commonly recorded site characteristics that include, for the most part, only nominal data. Much more specific data consisting of nominal as well as continuous variables can be gained through in-field artifact analysis. Once compiled, field-recorded attribute data constitute a qualitatively and quantitatively superior source of information with which to examine the archeological variability within a region.

In this vein, recommendations for future research in the Quemado area by the Bureau of Land Management center around the need for acquisition of additional data from large architectural sites and from much smaller low-density artifact scatters. Inventories of roomblock and midden assemblages, especially from later occupations, are needed in greater numbers than analyzed here, for investigation of ceramic and lithic variability among structural locations.

These additional data will enable assessment of lithic reduction sequences and possible reuse of midden debris at structural locations and the more accurate comparison of a larger number of structure-associated ceramic assemblages in assessing the differential occurrence of brownwares within the region. The Quemado area may offer one of the best opportunities to study the differential and localized occurrence of grayware and brownware in New Mexico, if not in the Southwest.

Although in-field and other recording procedures may be labor-intensive and time consuming, the information gained in terms of understanding the differential use of ceramic technologies in the area is well worth the effort expended and is more cost-effective than collecting materials for later analysis.

The composition of low-density, low-variety artifact scatters is another potentially productive avenue of research. Interpretations presented in this study suggest more variation in later period technological systems than is normally expected and, therefore, demonstrated by most researchers. Since assemblages from locations apt to inform on this question include small numbers of artifacts, a large sample of redundant cases is needed to evaluate use-history interpretations for such manifestations.

Variation in the use-histories of low-density, low-frequency artifact scatters must also be confirmed, in part, through examination of the spatial arrangement of items in such distributions. Lacking data on the spatial structure and internal contents of spatially extensive, but low-density distributions, suspected use-history differences among locations cannot be confirmed. Although the technology required to map individual artifacts contributing to such distributions was not available during this project, the use of electronic measurement devices and computerized data loggers is becoming widespread in archeological fieldwork. This equipment provides the ideal technology for recording spatially extensive archeological materials such as those encountered in the study area.

Ideally, the above investigations should be conducted in conjunction with a program of surface survey of relatively large, continuous areas. Answering questions about the intra-

site structure of extensive archeological distributions requires that large, continuous portions of the landscape be documented. This kind of intensive documentation may not be possible within a management framework designed to sample a tremendous amount of acreage; however, it could definitely be carried out during later, more intensive stages of archeological research within areas slated for coal leasing.

The shifting goals of this stage of archeological survey, from only attempting to identify "significant" resources to recovering as much archeological information as possible within the framework of available time and funding, provide a more well-founded basis for assessing the scientific merit and research potential of encountered archeological resources.

The keys to extracting more information than is normally obtained within a sample survey framework include having a "theoretical" goal planned prior to project initiation, pursuing this goal through the rigorous application of available technology, and logistical planning to facilitate combining these goals with directed, systematic hard work in order to answer questions important to managers and archeologists about the nature of the resource which is present. Using proper pre-project and within-project planning, we can extract such information during the course of nominal Phase II surveys.

Appendix 1

Site Survey Recording Forms

LA/Field No.______________

LABORATORY OF ANTHROPOLOGY, MUSEUM OF NEW MEXICO
ARCHEOLOGICAL SITE SURVEY FORM

LA No.__________ Site Name_________________ Other Inst.#________ I.O.__

MNM Proj.#______ UTM: Zone__ __ E__ __ __ __ __ __ __ N__ __ __ __ __ __ __ __

Legal Desc. T__ N/S R__ E/W Sec.____

______1/4 of the _______1/4 of the ______1/4

Unplatted____Grant____ Owner & Address____________________________________

*Map Reference:_________________________Date:_____________Scale:___________

County____________ State____________ Nearest Named Drainage _____________

Locational Desc.: Recognized Landmarks____________________________________

____

Site Type:____

Site Size: Length___________Width___________ Elevation (# of Feet) ____

Topographic Setting (Location & Access):__________________________________

____

___arroyo/wash	flood plain/	___plain/flat
___base of cliff	___valley bottom	___playa
___bench	___hill top	___ridge
___blowout	___hill slope	___saddle
___canyon rim	___low rise	___base talus slope
___cave	___mesa	___terrace
___cliff/scarp	___mountain	other (specify)_________
___constricted cyn	___mt. front/foothill	________________________
___dune	___open canyon floor	________________________

Local Vegetation____

____

Ecological Zone: forest___ woodland___ scrubland___ grassland___

desertscrub___ marshland___ other (specify) _____________________________

*Form must be accompanied by photocopy portion of USGS map showing T., R., scale and quad name.

Figure A1.1: Laboratory of Anthropology site survey form.

LA/Field No.____________

Soil Type: rocky___ gravelly___ sandy___ clayey___ other ____________

Local Outcrops: sandstone___ shale___ limestone___ basalt___ tuff___
other (specify) ____

Nature and Depth of Fill: ____

Arch. Status: Amount and Type of Work Past and Present ______________

____

____

____

____

National and/or State Register Status:
- ___On State Register
- ___On National and State Register
- ___Recommended for National by State, on State Register
- ___Recommended for National and State Register
- ___In District, National and State
- ___In District, National
- ___In District, State
- ___Recommended and rejected
- ___Insufficiently evaluated, potential unknown
- ___Not nominated

Condition of Site: intact___ grazed___ eroded___ mech. disturbance___
vandalized___ other ____

Mitigation: avoid___ monitor___ test___ excavate___ not required ____

Surveyed for____

Record Form: Surv. Forms___ Excav. Forms___ Sketch Map___ Photos______

Loc. of Forms, Maps, Photos ____

Surface and/or Subsurface Collections: yes___ no___ Strategy ________

____

Location of Collected Artifacts ____________________________________

Previous Collections?___ When__________________ Repository____________

Is there another site close by?____ LA or Field Identif.# __________

Artifact Density: 0, 10's, 100's, 1000's.

Time Diagnostic Artifacts:

Figure A1.1: Laboratory of Anthropology site survey form (Continued).

LA/Field No.____________

No. of Temporal Components____

(Earliest to Latest)

Temporal Component (1)

Features______________________________________

____

Culture____________ Period__________ Phase__________

Site Function:____________Best Date ____________

Method of Date: ____________________________

Temporal Component (2)

Features______________________________________

____

Culture____________ Period__________ Phase__________

Site Function____________Best Date ____________

Method of Date____________________________

Temporal Component (3)

Features______________________________________

____

Culture____________ Period__________

Phase__________

Site Function____________Best Date ____________

Method of Date____________________________

Additional Temporal Components

____

____

____

Figure A1.1: Laboratory of Anthropology site survey form (Continued).

LA/Field No.______________

Published Reference:

Date______________

Institution ____

Author and Title____

Remarks:____

Field Recorder____ Date __________________

Lab Recorder____ Date __________________

Figure A1.1: Laboratory of Anthropology site survey form (Continued).

SACRAP Unit Description

Environmental Description of Unit No. ____________________

Date __________ Surveyors ____________________

Location ____________________

____

Elevations ____________________

Terrain %s ____________________

____

Soils %s ____________________

____

Vegetation ____________________

____

General Exposure ____________________

Environmental Summary ____________________

____

____

Present Conditions: ____________________

____

____

I.O.s No.________: ____________________

____

Sites No.________: ____________________

____

____

____

Archaeological Summary ____________________

____

____

____

Access: ____________________

____

____

____

Figure A1.2: SACRAP Unit Description form.

San Augustine Reconnaissance Project — Ceramic Recording Form

Field No.______ LA No.______ Provenience ________________

Sample Description ________________

Recorder ________________ Date ________

Brownwares	Ceramic Type	Bowl	Jar	Indt	Smudged
Plain Brown					
Plain Polished					
Neckbanded					
Plain Corrugated					
Indented Corrugated					
Tooled Corrugated					
Fillet RM					
Unidentified Brown					

Graywares	Ceramic Type	Bowl	Jar	Indt	Smudged
Lino Plain					
Kana'a Neckbanded					
Plain Gray Body Sherd					
Plain Corrugated					
Clapboard					
Indented Corrugated					
Obliterated Corrugated					
Unidentified Gray					

Cibola White Wares, Etc.:	Bowls	Jars	Ladle	Indt
Lino B/G 575-875 (carbon)				
La Plata/Kana'a/Whitemound B/W 575-875				
Kiatuthlanna B/W 825-925				
Red Mesa B/W 800-1000				
Puerco B/W 925-1150				
Escavada B/W 950-1150 (sosi)				
Reserve B/W 950-1150				
Mimbres B/W 1000-1130				
Socorro B/W				
Gallup B/W 1000-1200 (hatchure)				
Tularosa B/W 1150-1250				
Reserve-Tularosa B/W				
Unident. Solid B/W (P11)950-1150				
Unident. Hatchure B/W (P11)950-1150				
Unident. Whiteware (body)				
Other				

White Mountain Redwares:	Bowls	Jars	Ladle	Indt
Puerco B/R 1000-1200 solids, checkers, parallel lines				
Wingate B/R 1050-1200 blood red hatchure				
Wingate Poly 1175-1300 red or white on exterior				
St. Johns B/R 1175-1300 orange-red Tularosa style				
St. Johns Poly 1175-1300 large white exterior des.				
Unident. WMRW B/R				
Unident. WMRW Poly				
Other				

Figure A1.3: San Augustine Reconnaissance Project — Ceramic Recording Form

SITE/ARCHITECTURE DATA CODING FORMAT

COLUMN	VARIABLE
1-3	Sample Unit
5-7	Site No.
8-9	Provenience
11-12	Environmental Zone
13-14	Terrain
15-16	Vegetation
17-20	Elevation
FEATURES - PREHISTORIC OCCUPATIONS	
21	# Outlined hearths
22	# Ash stains and/or fire-cracked rock scatter
23-24	# Refuse middens
25-26	# Pitstructures
27	# Water control features
28	# Pictographs/petroglyph panels
29	# Sandstone slab or rubble scatters (feature type not defineable)
30	# Other
FEATURES - HISTORIC OCCUPATIONS	
32	# Corrals
33	# Trash middens
34	# Windmills
35	# Ovens
36	# Hearths
37	# Outbuildings
38	# Earthen tanks
39	# Other
STRUCTURE AND ROOMBLOCK VARIABLES	
40	ID
42-44	# Rooms
45-46	Construction elements
47	Construction type
48	Structure or Roomblock groundplan
49-51	Maximum length (m)
52-54	Maximum width (m)
55-56	# Kivas
57-58	Mean kiva diameter
59	# Plazas
60	# Dance plazas
AREA MEASUREMENTS (m2)	
66-72	Site area
73-75	Mean midden area
76-77	Mean pitstructure diameter
OTHER VARIABLES	
78	Exposure
79	Historic 1=yes
80	Disturbed (vandalized, chained, etc.)

Column	Variable
11-12	ENVIRONMENTAL Zone

1 = A Mesa Top
2 = B Steep Talus
3 = C Ridges and Foothills
4 = D Alluvial Flats

13-14 TERRAIN

1= arroyo/wash
2= floodplain/valley bottom
3= plain/flat
4= open canyon floor
5= low rise
6= ridge
7= saddle
8= base of talus
9= bench
10= base of cliff
11= cliff/scarp
12= canyon rim
13= mesa
14= dune
15= blowout
16= hilltop
17= hill slope
18= cave/rockshelter
19= mountain
20= mtn front/foothill
21= talus
22= other(specify)

15-16 VEGETATION

1= grassland
2= scrubland
3= P-J parkland
4= P-J woodland
5= J-P woodland
6= marshland
7= forest
8= other (specify)

FEATURES 9= 9 or greater than 9

STRUCTURE AND ROOMBLOCK VARIABLES

45-46 CONSTRUCTION ELEMENTS

1= sandstone slabs
2= irregular sandstone block
3= shaped sandstone block
4= sandstone spall chinking
5= upright sandstone slabs
6= basalt and irregular block
7= basalt and subangular cobble
8= board and batten
9= bark slabs
10= unsurfaced log
11= hewn log
12= jacal
13= adobe
14= bark slab & board and batten
15= masonry and jacal
16= basalt cobble and jacal
17= masonry, slab and jacal
19= shaped block and jacal

47 CONSTRUCTION TYPE

1= foundation alignment
2= simple masonry
3= compound masonry
4= core/ veneer masonry
5= log
6= adobe
7= frame
8= jacal or jacal & adobe
9= indeterminate

48 GROUNDPLAN

1= arc
2= rectangular
3= square
4= rectangular with wings
5= L-shaped
6= circular
7= irregular
8 indeterminate

78 EXPOSURE

1= N
2= S
3= W
4= E
5= NE
6= SE
7= NW
8=SW
9= open or all

Figure A1.4: General observations and feature categories coded for sites and proveniences.

Appendix 2

Architecture Recording Format

By John R. Stein

The documentation of architectural remains has been approached in a manner consistent with that described for the more portable items of material culture. Observation of surface remains will allow for definition of the range of architectural variation, both prehistoric and historic, to be found within the survey area (Appendix 1, Figure A1.4).

Methods

A survey inventory of archeological resources involves no subsurface testing. Documentation of architectural remains must, therefore, be made from the surface perspective. Details of architectural form and construction, while not readily visible in a reduced structure, can often be inferred from the surface expression of the rubble mound.

Due to the vagaries of natural processes, vandalism, and other factors, it is often not possible to collect important categories of information such as room size or structure ground plan. This is particularly true of below grade architectural forms such as pit rooms or structures with perishable superstructures. Direct evidence of these types of architectural forms is often in the form of amorphous ash stains, shallow depressions or scatters of foundation elements. Obviously there are limitations to an analysis of architecture based solely on surface evidence, as differential preservation will mitigate against discovery and categorization of some structural forms.

Glossary of Architectural Terms

Rooms

Rooms can be generally divided into two categories: surface and subsurface. Rooms are defined by Lekson (1984) as a roofed area (space) separated from other areas by walls or partitions.

Rooms might be considered as the basic architectural unit (and something which can stand by themselves) or articulate so as to form the structural fabric for a larger structure.

Room sizes (interior dimensions) vary considerably between contemporary but functionally dissimilar architectural forms and noncontemporary but functionally similar forms. Room dimensions provide a good index of space use, information pertinent to questions of cultural affiliation. Temporal affiliation and function can be addressed using room dimensions.

Field observations of room dimensions are often speculative in nature. Occasionally wall alignments are clearly visible, such as in a deflated surface exposing the foundation elements of a jacal structure.

The number of rooms within a building is often inferred from a few visible alignments within a roomblock. In these instances the actual number of visible rooms should be noted.

Construction Elements: Prehistoric

Masonry – Lithologies utilized in the construction of masonry buildings are predominantly sandstones of the Gallup member of the Mesaverde Group and sub-angular basalts originating in the Datil formation as clastic bombs in a welded tuff matrix, ultimately reduced to a high surface lag. Angular basalts from numerous volcanic intrusions abound. Both sandstones and basalts are virtually ubiquitous within the survey area; however, the quality of the available sandstone is highly variable.

Dense, durable sandstone with tabular fracture occurs principally within the northwest portion of the survey area. In the study area, the variability in sandstone conditions is, to a large degree, the architectural character of buildings.

Evidence from surface remains suggests that soft friable sandstones (probably obtained from weathered talus deposits) were utilized extensively. This is in contrast, for example, to similar buildings in the San Juan Basin constructed of durable sandstone with an even tabular fracture.

Adobe – Very large buildings constructed wholly or in part of adobe are known from the survey area. Adobe construction from the Pueblo III period is documented by McGimsey (1980) at Site UG616. Walls were constructed of adobe blocks which were apparently hand formed. It is reasonable to assume that other forms of adobe construction were also utilized. Surface evidence suggests that masonry was occasionally mixed with otherwise predominantly adobe walls. Soils suitable for durable adobe construction are widely available throughout the survey area. The use of adobe in construction, except in very large buildings where a mound is still visible, is extremely difficult to verify from surface evidence.

Jacal – Jacal construction utilizes upright posts as wall elements. Jacal construction is common in the SACA as a construction technique during historic and prehistoric times. Jacal is often used in combination with other construction techniques such as adobe or masonry. Alignments of foundation stones in the absence of a rubble mound usually indicate a structure with a perishable superstructure, such as jacal or wattle-and-daub.

It is likely that evidence for jacal construction, save for structures which have burned, will be minimal from the surface perspective. Hough (1919) excavated the remains of a jacal palisade, surrounding a dance plaza located southwest of the survey area. It is probable that jacal was extensively utilized prehistorically in both vernacular and public architectural forms within the study area.

Wattle-and-daub – Wattle-and-daub construction differs from jacal in that the diameter of upright posts are smaller and vertical elements are evenly spaced but not contiguous. Horizontal elements such as reeds or willows are woven into the wall fabric and then heavily plastered with adobe.

Surface evidence for wattle-and-daub construction differs little from jacal and consists of alignments of surface foundation elements and occasional upright slabs, which probably served originally to stabilize the walls and protect them from moisture. Many structures constructed of wattle and/or jacal burned, leaving the impression of the wall fabric in the vitrified adobe. While the load-bearing spine of a pueblo is usually constructed of masonry or adobe and thus well preserved as a rubble mound, the evidence for jacal and/or wattle construction will likely not be present. Storage rooms, pens, shades, and other constructions of jacal and wattle are almost certainly much more prevalent than surface evidence would indicate.

Survey documentation notes jacal and/or wattle-and-daub construction when surface alignments of upright slabs or simple alignments of stones indicates a structure with a perishable superstructure. Structures of this type are also inferred from surface scatters of slabs or stones found in association with scatters of ceramic and lithic debris. Jacal buildings are almost never found in association with formal middens.

Because jacals burned, vitrified fragments of the adobe wall mortar will sometimes be found

among the fire-reddened slabs of foundations. In the documentation process, the term jacal will be utilized to imply any structure utilizing upright posts in the wall fabric.

Construction Elements: Historic

Board and Batten – Board and batten construction is essentially a frame type of building utilizing broad, usually rough cut planks placed in a vertical position and abutting to form the wall. Cracks between the boards are sealed by nailing on narrower vertical elements.

Board and batten is a very cheap form of construction used extensively during the early twentieth century primarily for barns and outbuildings. Very little framing is necessary to construct a building of this type.

Bark Slab – The first cut through a log results in a rough cut plank with a bark surface on the outside. These were very cheaply obtained and are utilized extensively in outbuildings.

Unsurfaced Log/Hewn Log – Horizontal notched log structures are common in the survey area.

Masonry – The use of masonry historically is common in the survey area. Sandstone is the preferred material of construction. Wall types are equivalent to those described for the prehistoric periods. Compound construction is most common.

Adobe – Adobe construction is commonly utilized in the survey area. All known buildings to date are built of moulded block.

Jacal – Construction of large upright posts set into a notched horizontal bond beam is present within the survey area. Often this type of construction is found in combination with masonry or adobe.

Wall Types

Lekson (1984) describes masonry wall types for Chaco Canyon in northwestern New Mexico. Because prehistoric construction techniques are relatively uniform throughout the Colorado Plateau, these types can easily be applied to the SACA.

Wall types vary considerably in Anasazi construction and are useful indicators of time period and function. Because details of wall construction are difficult to obtain from the surface perspective, only basic construction categories will be utilized for this analysis.

The following three construction techniques can be inferred from wall width and the mound relief or masonry buildings.

Simple Construction – Simple masonry walls are a single stone in width. The arrangement of masonry elements and surface treatment can vary considerable. The width for these types of walls averages at 0.30 m.

Compound Construction – Compound walls are two and sometimes more stones in width. Wall elements overlapping and interdigitating on the interior of wall and individual elements are visible on only one surface of the wall. This type of construction allows for a very strong load-bearing wall that can support several stories.

Although wall widths can vary considerably, a width of 0.40 to 0.50 m will often indicate compound construction. McGimsey (1980) noted walls of compound construction that utilized differing element composition within a single wall and resulted in two opposite surfaces of entirely different character. It was further noted that these different treatments of the wall face alternated from interior to exterior and from room to room.

Rubble Core – Rubble core walls include several construction techniques. This type of wall, commonly known as core-and-veneer construction, is usually carefully faced with essentially nonstructural coursed slabs and spalls. Rubble core walls were used almost exclusively in public forms of architecture during the Pueblo Period. Examples to 2.5m in thickness are known from the survey area. Not all faced walls within the survey area, however, are of rubble core construction. A massive wall of simple block construction supported an interior veneer at the Al-Lin site (NM-02-1555). The size of the rooms within this building, the period (Pueblo II), and the location suggest a small public building.

The following wall types are seen in buildings with perishable superstructures:

Upright Slabs — The presence of upright slabs usually indicates either a slab-lined feature such as a hearth or bin or a jacal structure. (See descriptions of jacal, wattle-and-daub, and adobe.)

Coarsed Slab (Low or Surficial Alignments) Surficial alignments of horizontally laid slabs are interpreted as foundations for jacal, adobe, or wattle-and-daub structures.

Ground Plan

The plan is the formal layout of a structure (Figure A2.1). The plan of a reduced building is determined by plotting the visible wall or foundation remnants. In many instances, the alignments of walls are not visible from the surface perspective. Under these circumstances, the plan can be inferred from the topographic expression of the rubble mound. The following are variations in plan for prehistoric structures within the SACA. Although not discussed here, these categories are also applicable to a wide range of structural variation extant during the historic period.

Arc — Contiguous surface rooms arranged in an arc is a common plan for the early sedentary period throughout the Eastern Anasazi province. Good examples of this type of building have yet to be documented within the SACA due possibly to a general lack of occupation dating to this period. Usually this type of structure is evidenced by massive upright slabs indicative of jacal and/or wattle-and-daub construction. Occasionally, the arc is found in association with coursed masonry construction, particularly public architectural forms of the late Pueblo occupation.

Rectangular — Rectangular can be applied to both single room structures and multi-room structures which exhibit a rectangular plan. Single rows of contiguous rooms will be discussed under the linear section. Rectangular surface rooms and blocks of surface rooms are common throughout the later pueblo periods. Although rectangular and subrectangular (rectangularly shaped with rounded corners) subterranean rooms are known from the survey area, they will most always appear from the surface perspective to be circular.

Square — Both single-room and multi-room structures may exhibit a square plan. As discussed above, some subterranean rooms may be square in plan but exhibit a circular surface expression.

Rectangular with Wings: Bracket, "U" "L" "E" and "T" Shapes — The addition of rooms perpendicular to the long axis of a linear or rectangular row of contiguous rooms can result in a variety of geometric shapes. As a general rule, the "wings" added to a roomblock will not exceed the length of the long axis of the building; however, the enclosure formed by the wings of a building may contain a subterranean room or kiva. In later public forms of architecture, this space may be further formalized by the addition of a retaining wall to create a plaza, giving the structure an overall "D" shape.

Circular — Circular plans are primarily confined to subterranean or semisubterranean architectural forms. Fully subterranean pit rooms and kivas occur in a variety of shapes. Circular, square, subrectangular and tadpole shapes are common. These features will usually appear to be circular in plan from a surface perspective,. Public forms of architecture, such as great kivas and dance plazas (discussed below), are known to be circular in shape within the survey area. For purposes of identification in the field, depressions in close association with a roomblock will be termed a kiva. Depressions not associated or indirectly associated with surface roomblocks will be designated pit rooms.

Irregular — Growth by accretion often results in roomblocks that are irregular in plan. Various combinations of contiguous and non-contiguous rooms may be included in this category.

Linear — Simple arrangements of rooms forming a roomblock, which is a single room in width, are termed herein as linear. Although this is a common plan for surface roomblocks throughout the Puebloan occupation, it is largely restricted to jacal and wattle-and-daub constructions and is often only evidenced by

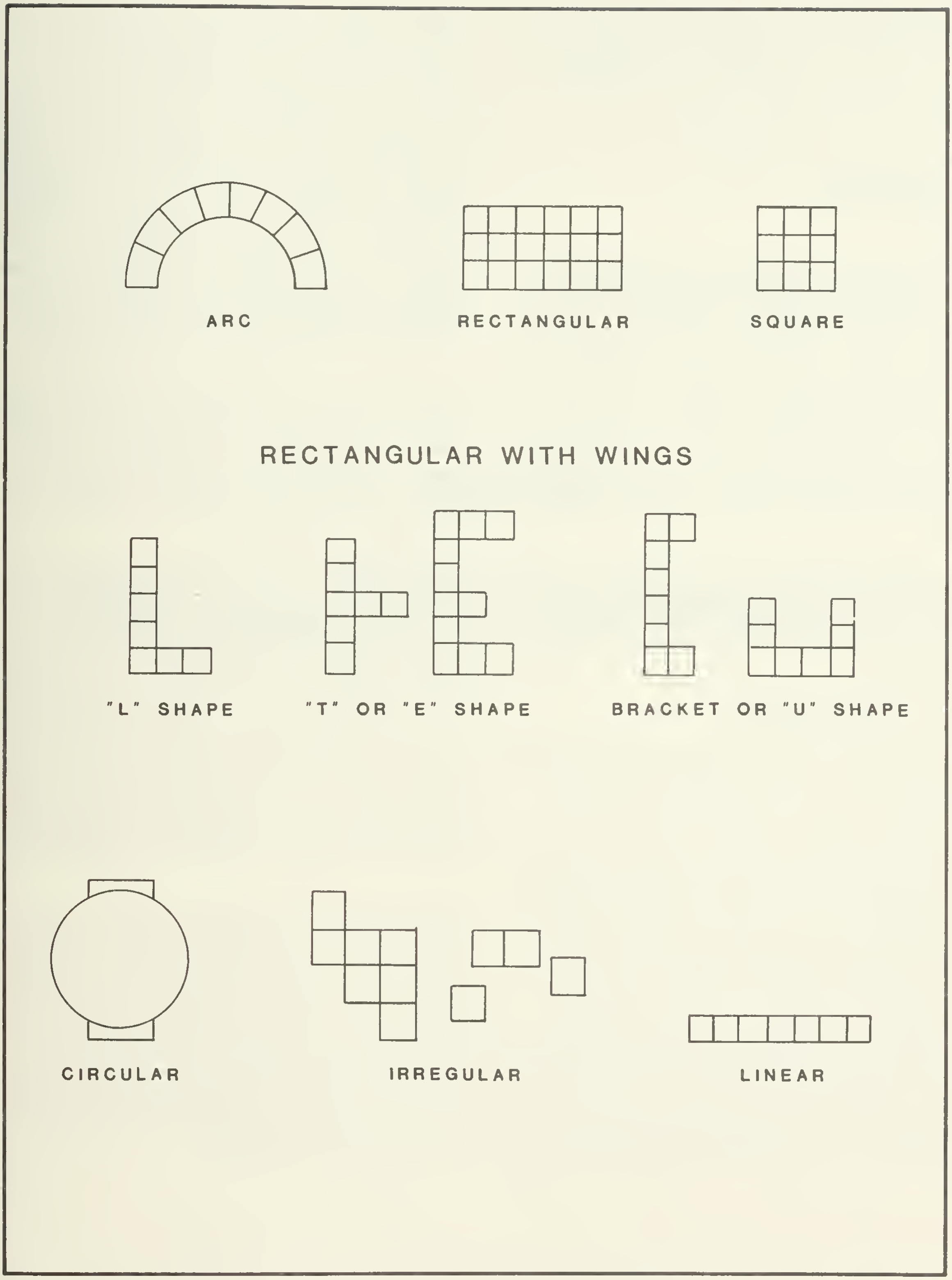


Figure A2.1: Variations in Ground Plan for Prehistoric Structures.

surficial alignments of coursed or upright foundation stones. In the early Pueblo period, this type of roomblock might be considered a variation of the arc plan and is usually associated with multiple pit rooms.

Other Features and Forms of Architecture

Middens

Concentrations of ceramic and lithic debris in formal "middens" is a time diagnostic trait of habitation and complex architectural forms in the mid- to late-Pueblo periods. A midden is an element of the architectural fabric of a structure, if it is composed in part of construction materials or a sterile earthen matrix and exhibits a positive topographic expression. Formal middens are an aspect of architectural expression closely associated with the Eastern Anasazi.

The presence of formal midden features with architectural forms associated with the Mogollon archeological culture will be addressed in this analysis.

Complex Architectural Forms

Various public or communal residential forms are represented in the Study Area from the mid-Pueblo II to the mid-Pueblo III periods.

One inferred form of public architecture is known primarily from the San Juan Basin and Zuni Cibola and Mesa Verde areas (Lekson 1984; Marshall et al. 1979). Structures of similar character and proportions have been identified within the Study Area. These buildings are characterized by massive construction, elevated surface kivas, multi-story construction, and association with great kivas or dance plazas. In the San Juan Basin, this complex architectural form has been demonstrated to be consistently associated with prehistoric roadways (Kincaid et al. 1983).

Great Kivas – Great kivas are a semisubterranean architectural form, circular in shape and ranging from 12 m to greater than 20 m in diameter. Although square great kivas are known to the south and west of the survey area, only the circular variety is known from the Quemado Region. Great kivas are formal, roofed, masonry structures with consistent treatment of the interior furniture over a very broad area. A northern antechamber is usually present as a large surface alcove or room which serves as an entrance to the structure. Additional surface alcoves are often appended to the kiva to the south, east, and west.

To date no great kivas earlier than the late Pueblo II period are known from the project area. For a description of great kiva architecture, see Kincaid et al. (1983:9-16 to 9-18), Lekson (1984), Marshall et al. (1979), and Vivian and Reiter (1960).

Dance Plazas – Very large circular subterranean features ranging to greater than 25 m in diameter have been interpreted as dance plazas and occur within the Study Area during the late Pueblo II and earlyPueblo III periods. One such structure at UG143 was partially excavated by McGimsey (1980:172-175) and found to be unroofed and lacking the characteristic floor features of the great kiva. Dance plazas represent a variation of the great kiva form and may have functioned in similar manner.

Compounds – Compound is used to refer to several very large (300+ rooms) structures which date to the Pueblo III period. McGimsey (1980) reports on two of these structures, the Shipman site and Trechado Spring site. The Spring site and Unit No. 2 of NM-02-1622 also appear to represent structures of the compound type. Compounds consist of large open air plazas fully enclosed by roomblocks or massive masonry walls.

Appendix 3

Site, Feature and Architectural Data

Table A3.1: Site/Architecture Inventory: General Observations

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Elevation	Exposure	Site/prov area	Prehist feats	Hist feats	Structural feats
1	1	157	L/C scat	D	Hill slope	J-P wood	6940	E	900	.	.	.
2	1	133	L-scat	C	Ridge	J-P wood	6780	N	40	.	.	.
3	1	157	L/C scat	C	Hill slope	P-J park	6960	SE	2500	.	.	.
9	1	153	L-scat	C	Low rise	P-J wood	7060	Unk	.	.	.	.
185	1	0	P-H str/ft	C	Ridge	J-P wood	6640	360	29600	7	1	23
225	1	153	L/C scat	C	Low rise	P-J wood	7060	SE	1220	.	.	.
226	1	153	P-H feats	C	Ridge	P-J wood	7070	NE	560	2	.	.
227	1	150	P-H str/ft	C	Ridge	P-J wood	7060	SE	1350	1	.	8
228	1	150	P-H str/ft	C	Ridge	P-J wood	7050	N	1000	3	.	5
229	1	163	L/C scat	C	Ridge	P-J wood	6880	NE	800	.	.	.
229	2	163	L/C scat	C	Ridge	P-J wood	6880	NE	1200	.	.	.
230	1	163	P-H feats	C	Low rise	P-J park	6900	SE	1250	1	.	.
231	1	163	P-H feats	C	Arroyo/wash	P-J wood	6940	SE	900	4	.	.
232	1	163	L/C scat	C	Talus	P-J wood	6940	NE	2500	.	.	.
232	2	163	L/C scat	C	Mesa	P-J wood	6960	360	2500	.	.	.
233	1	163	P-H str/ft	C	Talus base	P-J park	6920	S	1000	1	.	9
234	1	163	P-H strs	C	Talus base	P-J wood	6930	S	135	.	.	2
234	2	163	P-H feats	C	Talus base	P-J wood	6930	S	100	1	.	.
234	3	163	P-H feats	C	Talus base	P-J wood	6930	S	4500	1	.	.
235	1	163	P-H str/ft	C	Low rise	P-J park	6920	S	1500	1	.	15
236	1	133	P-H feats	C	Ridge	J-P wood	6780	N	25	3	.	.
237	1	133	P-H feats	C	Ridge	J-P wood	6800	SE	3400	5	.	.
238	1	133	P-H feats	C	Ridge	J-P wood	6780	E	1012	3	.	.
239	1	133	P-H strs	C	Ridge	J-P wood	6710	E	900	.	.	1
240	1	133	L/C scat	C	Ridge	J-P wood	6780	NE	30	.	.	.
240	2	133	L-scat	C	Ridge	J-P wood	6780	NE	270	.	.	.
240	3	133	L-scat	C	Ridge	J-P wood	6780	NE	125	.	.	.
241	1	133	L/C scat	C	Ridge	P-J wood	6780	E	1575	.	.	.
242	1	133	L/C scat	C	Hill slope	Scrub	6740	N	325	.	1	.
242	2	133	Hist fea/scat	C	Hill slope	Scrub	6740	N	1000	.	1	.
243	1	133	P-H feats	C	Hill slope	J-P wood	6750	N	8055	3	.	.
244	1	554	L/C scat	D	Flood/valley	Grass	6820	360	480	.	.	.
245	1	230	P-H feats	C	Ridge	J-P wood	6840	N	7280	3	.	.
246	1	230	P-H feats	C	Hill slope	J-P wood	6840	N	11700	6	.	.
246	2	230	P-H feats	C	Ridge	J-P wood	6860	S	45	1	.	.
247	1	546	P-H str/ft	D	Ridge	P-J park	6890	E	625	1	.	2
247	2	546	P-H feats	D	Ridge	P-J park	6890	E	225	2	.	.
248	1	546	P-H str/ft	D	Ridge	P-J park	6885	SE	3600	1	.	7
249	1	546	L-scat	D	Ridge	P-J park	6970	S	200	.	.	.
250	1	546	L/C scat	D	Low rise	P-J park	6970	S	1000	.	.	.
251	1	545	P-H str/ft	C	Hill slope	P-J wood	6990	S	1000	2	.	1
252	1	406	P-H feats	C	Cliff/scarp	J-P wood	6920	360	3900	3	.	.
253	1	406	P-H str/ft	C	Ridge	P-J wood	6940	E	1000	3	.	3
254	1	414	P-H feats	D	Low rise	Scrub	6890	360	805	1	.	.
255	1	414	P-H strs	D	Low rise	Scrub	6890	W	3600	.	.	1

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/ prov area	Pre-hist feats	Hist feats	Struc-tural feats
256	1	414	Hist strs	D	Hill slope	P-J park	6940	S	100	.	.	1
257	1	0	P-H feats	C	Cliff/scarp	P-J wood	6900	W	150	2	.	.
258	1	49	L-scat	C	Ridge	P-J wood	7100	360	360000	.	.	.
259	1	467	Hist strs	C	Hill slope	P-J wood	6790	E	900	.	1	1
260	1	359	L/C scat	C	Talus	Grass	6700	N	1350	.	.	.
261	1	281	L/C scat	D	Low rise	Grass	6925	N	208	.	.	.
262	1	0	P-H strs	D	Ridge	P-J wood	6930	E	1350	.	.	4
263	1	0	P-H str/ft	D	Hill slope	Grass	6960	SE	7000	1	.	47
263	2	0	P-H str/ft	D	Hill slope	Grass	6960	SE	2500	1	.	9
263	3	0	P-H str/ft	D	Hill slope	Grass	6960	SE	2500	1	.	0
264	1	520	P-H feats	C	Ridge	J-P wood	6830	SW	900	1	.	.
264	2	520	P-H feats	C	Ridge	J-P wood	6830	SW	100	1	.	.
265	1	520	P-H feats	C	Ridge	J-P wood	6820	S	3500	1	.	.
266	1	515	P-H feats	C	Low rise	Grass	6790	360	100	1	.	.
266	2	515	P-H str/ft	C	Low rise	Grass	6790	360	1500	5	.	0
267	1	515	P-H feats	C	Ridge	J-P wood	6835	N	3200	2	.	.
268	1	520	P-H feats	C	Ridge	J-P wood	6850	360	21	1	.	.
268	2	520	P-H feats	C	Ridge	J-P wood	6850	N	63	1	.	.
268	3	520	P-H feats	C	Ridge	J-P wood	6850	N	169	1	.	.
268	4	520	P-H feats	C	Ridge	J-P wood	6850	E	9	1	.	.
268	5	520	P-H feats	C	Ridge	J-P wood	6850	E	9	1	.	.
268	6	520	P-H feats	C	Ridge	J-P wood	6850	E	88	1	.	.
268	7	520	P-H feats	C	Ridge	J-P wood	6850	S	12	1	.	.
268	8	520	P-H feats	C	Ridge	J-P wood	6850	S	56	1	.	.
268	9	520	P-H feats	C	Ridge	J-P wood	6850	S	36	1	.	.
268	10	520	P-H feats	C	Ridge	J-P wood	6850	S	4	1	.	.
268	11	520	P-H feats	C	Ridge	J-P wood	6850	S	4	1	.	.
268	12	520	P-H feats	C	Ridge	J-P wood	6850	S	16	1	.	.
268	13	520	P-H feats	C	Ridge	J-P wood	6850	S	36	1	.	.
268	14	520	P-H feats	C	Ridge	J-P wood	6850	S	16	1	.	.
268	15	520	P-H feats	C	Ridge	J-P wood	6850	S	8	1	.	.
268	16	520	P-H feats	C	Ridge	J-P wood	6850	S	8	1	.	.
268	17	520	C-scat	C	Ridge	J-P wood	6850	W	1	.	.	.
269	1	520	P-H feats	C	Ridge	P-J wood	6830	S	100	1	.	.
269	2	520	Hist fea/scat	C	Ridge	P-J wood	6830	S	1600	.	1	.
270	1	438	L/C scat	C	Ridge	P-J wood	6960	NW	100	.	.	.
270	2	438	P-H str/ft	C	Ridge	P-J wood	6960	NW	2250	2	.	0
270	3	438	P-H strs	C	Ridge	P-J wood	6960	360	.	.	.	1
270	4	438	L/C scat	C	Ridge	P-J wood	6960	360	200	.	.	.
270	5	438	P-H str/ft	C	Ridge	P-J wood	6960	360	1500	1	.	2
270	6	438	P-H str/ft	C	Ridge	P-J wood	6960	W	10000	0	.	0
270	7	438	P-H str/ft	C	Ridge	P-J wood	6960	SW	.	1	.	3
270	8	438	P-H str/ft	C	Ridge	P-J wood	6960	SW	.	0	.	0
270	9	438	P-H strs	C	Ridge	P-J wood	6960	NE	2750	.	.	5
270	10	438	P-H str/ft	C	Ridge	P-J wood	6960	W	900	0	.	0

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/prov area	Pre-hist feats	Hist feats	Struc-tural feats
270	11	438	P-H str/ft	C	Ridge	P-J wood	6960	W	1600	0	.	5
270	12	438	P-H str/ft	C	Ridge	P-J wood	6960	W	1400	7	.	0
270	13	438	P-H str/ft	C	Ridge	P-J wood	6960	NW	800	0	.	0
270	14	438	P-H str/ft	C	Ridge	P-J wood	6960	NW	400	0	.	0
270	15	438	P-H str/ft	C	Ridge	P-J wood	6960	NE	5000	0	.	0
270	16	438	P-H str/ft	C	Ridge	P-J wood	6960	NE	400	0	.	0
270	17	438	P-H str/ft	C	Ridge	P-J wood	6960	360	4000	4	.	0
270	18	438	P-H str/ft	C	Ridge	P-J wood	6960	360	8000	8	.	2
270	19	438	P-H feats	C	Ridge	P-J wood	6960	W	140	1	.	.
270	20	438	P-H str/ft	C	Ridge	P-J wood	6960	360	10000	2	.	36
270	21	438	P-H strs	C	Ridge	P-J wood	6960	360	400	.	.	2
270	22	438	P-H strs	C	Ridge	P-J wood	6960	360	1800	.	.	2
271	1	0	Hist strs	C	Ridge	P-J park	7060	S	8800	.	13	5
272	1	187	P-H feats	C	Hill slope	P-J wood	7050	NW	2500	1	.	.
273	1	187	P-H str/ft	C	Hill top	P-J wood	7060	360	35	2	.	2
273	2	187	P-H strs	C	Hill top	P-J wood	7060	360	54	.	.	2
273	3	187	P-H strs	C	Hill top	P-J wood	7060	360	42	.	.	1
273	4	187	P-H feats	C	Hill top	P-J wood	7060	360	500	2	.	.
274	1	187	P-H feats	C	Ridge	P-J wood	7080	SW	28000	14	.	.
275	1	187	P-H strs	C	Hill slope	P-J wood	7100	NW	60	.	.	1
275	2	187	P-H strs	C	Hill slope	P-J wood	7100	NW	36	.	.	1
275	3	187	P-H str/ft	C	Hill slope	P-J wood	7100	NW	100	1	.	4
276	1	187	P-H feats	C	Hill slope	P-J wood	7120	N	7700	11	.	.
277	1	187	L/C scat	C	Hill slope	P-J wood	7110	NE	2275	.	.	.
278	1	187	P-H feats	C	Saddle	P-J wood	7130	N	450	1	.	.
278	2	187	P-H feats	C	Saddle	P-J wood	7130	N	250	1	.	.
278	3	187	P-H feats	C	Saddle	P-J wood	7130	N	110	2	.	.
278	4	187	L-scat	C	Saddle	P-J wood	7130	N	36	.	.	.
278	5	187	P-H feats	C	Saddle	P-J wood	7130	N	96	1	.	.
278	6	187	P-H feats	C	Saddle	P-J wood	7130	N	90	1	.	.
278	7	187	P-H feats	C	Saddle	P-J wood	7130	N	63	1	.	.
278	8	187	P-H feats	C	Saddle	P-J wood	7130	N	1	1	.	.
278	9	187	P-H feats	C	Saddle	P-J wood	7130	N	240	1	.	.
278	10	187	P-H feats	C	Saddle	P-J wood	7130	N	6	1	.	.
278	11	187	P-H feats	C	Saddle	P-J wood	7130	N	72	1	.	.
278	12	187	P-H feats	C	Saddle	P-J wood	7130	N	15	1	.	.
278	13	187	P-H feats	C	Saddle	P-J wood	7130	N	8	1	.	.
278	14	187	P-H feats	C	Saddle	P-J wood	7130	N	4	1	.	.
278	15	187	P-H feats	C	Saddle	P-J wood	7130	N	4	1	.	.
278	16	187	P-H feats	C	Saddle	P-J wood	7130	N	4	1	.	.
278	17	187	P-H feats	C	Saddle	P-J wood	7130	N	160	0	.	.
279	1	187	P-H str/ft	C	Hill slope	P-J wood	7150	SE	1750	1	.	1
280	1	191	P-H str/ft	C	Hill slope	P-J wood	7120	SE	1200	4	.	6
280	2	191	P-H strs	C	Hill slope	P-J wood	7120	SE	900	.	.	2
280	3	191	P-H strs	C	Hill slope	P-J wood	7120	SE	100	.	.	6

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/prov area	Pre-hist feats	Hist feats	Struc-tural feats
280	4	191	P-H strs	C	Hill slope	P-J wood	7120	SE	100	.	.	2
280	5	191	P-H feats	C	Hill slope	P-J wood	7120	SE	1800	11	.	.
281	1	191	P-H feats	C	Hill slope	P-J wood	7120	S	506	1	.	.
281	2	191	P-H strs	C	Hill slope	P-J wood	7120	S	432	.	.	0
282	1	140	Hist fea/scat	C	Hill slope	P-J park	6820	E	2000	.	3	.
283	1	140	L-scat	A	Mesa	P-J park	6885	360	1220	.	.	.
290	1	0	P-H str/ft	B	Ridge	P-J wood	7130	N	3600	1	.	4
291	1	40	P-H str/ft	B	Ridge	P-J wood	7160	E	648	1	.	14
291	2	40	P-H feats	B	Ridge	P-J wood	7160	N	1020	4	.	.
291	3	40	P-H feats	B	Ridge	P-J wood	7160	W	640	1	.	.
292	1	40	L/C scat	B	Ridge	P-J wood	7220	N	225	.	.	.
293	1	40	P-H feats	B	Ridge	P-J wood	7260	N	903	1	.	.
293	2	40	L/C scat	B	Ridge	P-J wood	7260	N	266	.	.	.
294	1	40	P-H feats	B	Ridge	P-J wood	7260	S	4500	10	.	.
295	1	40	P-H feats	B	Ridge	P-J wood	7220	S	300	2	.	.
296	1	40	P-H strs	B	Ridge	P-J wood	7240	360	1050	.	.	2
311	1	533	P-H feats	C	Ridge	P-J wood	7001	E	1600	4	.	.
311	2	533	P-H feats	C	Ridge	P-J wood	7001	360	150	2	.	.
311	3	533	L/C scat	C	Ridge	P-J wood	7001	N	200	.	.	.
312	1	533	P-H feats	C	Ridge	J-P wood	6920	E	600	3	.	.
313	1	442	L/C scat	C	Ridge	P-J park	6900	SE	1000	.	.	.
314	1	442	P-H str/ft	C	Ridge	J-P wood	6900	E	1350	1	.	7
315	1	442	Hist fea/scat	C	Arroyo/wash	P-J wood	6920	NE	150	.	1	.
316	1	442	P-H feats	C	Ridge	P-J wood	6920	N	400	1	.	.
317	1	442	L/C scat	C	Ridge	P-J wood	6920	E	600	.	.	.
318	1	538	P-H strs	D	Flood/valley	Grass	6880	360	130	.	.	2
319	1	538	L/C scat	C	Ridge	P-J wood	6900	N	1050	.	.	.
320	1	538	Hist strs	D	Flood/valley	Grass	6880	360	400	.	1	1
321	1	418	P-H strs	C	Ridge	J-P wood	6820	360	1400	.	.	2
321	2	418	Hist fea/scat	C	Ridge	J-P wood	6820	360	400	.	2	.
322	1	416	L/C scat	C	Canyon floor	P-J park	6850	N	700	.	.	.
322	2	416	L-scat	C	Canyon floor	P-J park	6850	N	4000	.	.	.
322	3	418	L-scat	C	Canyon floor	P-J park	6850	N	750	.	.	.
322	4	418	L-scat	C	Canyon floor	P-J park	6850	N	2500	.	.	.
323	1	416	Hist strs	D	Canyon floor	P-J park	6920	S	450	.	.	1
324	1	331	P-H feats	D	Hill slope	Grass	6950	W	1400	1	.	.
325	1	332	L/C scat	D	Hill slope	P-J park	6935	S	1050	.	.	.
326	1	0	P-H strs	C	Hill slope	J-P wood	6950	SE	35	.	.	5
326	2	0	P-H strs	C	Hill slope	J-P wood	6950	SE	40	.	.	2
327	1	331	P-H str/ft	D	Hill slope	J-P wood	6960	W	1200	2	.	0
327	2	331	P-H str/ft	D	Hill slope	J-P wood	6960	W	400	1	.	0
328	1	191	P-H strs	C	Hill slope	P-J wood	7100	SE	1350	.	.	4
328	2	191	P-H feats	C	Hill slope	P-J wood	7100	SE	72	1	.	.
328	3	191	P-H feats	C	Hill slope	P-J wood	7100	SE	525	3	.	.
328	4	191	P-H feats	C	Hill slope	P-J wood	7100	SE	750	3	.	.

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Elevation	Exposure	Site/prov area	Prehist feats	Hist feats	Structural feats
329	1	191	P-H str/ft	C	Hill slope	P-J park	7100	S	1200	1	.	3
330	1	0	P-H str/ft	C	Hill slope	P-J wood	7060	SE	8000	3	.	10
330	2	0	P-H str/ft	C	Hill slope	P-J wood	7060	SE	2000	2	.	5
330	3	0	P-H str/ft	C	Hill slope	P-J wood	7060	SE	4800	3	.	21
331	1	0	P-H strs	C	Ridge	P-J park	7060	S	2660	.	.	46
331	2	0	P-H feats	C	Ridge	P-J park	7060	360	384	1	.	.
331	3	0	P-H strs	C	Ridge	P-J park	7060	S	575	.	.	5
331	4	0	P-H feats	C	Ridge	P-J park	7060	360	432	1	.	.
331	5	0	P-H strs	C	Plain/flat	P-J park	7060	360	9000	.	.	1
331	6	0	P-H feats	C	Arroyo/wash	P-J park	7060	360	900	1	1	.
331	7	0	P-H strs	C	Plain/flat	P-J park	7060	360	15	.	.	2
333	1	0	P-H strs	A	Mesa	P-J park	6940	SW	625	.	.	15
333	2	0	P-H strs	A	Mesa	P-J park	6940	W	1125	.	.	21
333	3	0	P-H strs	A	Mesa	P-J park	6940	SE	250	.	.	7
333	4	0	P-H strs	A	Mesa	P-J park	6940	SE	100	.	.	2
333	5	0	P-H strs	A	Mesa	P-J park	6940	SE	700	.	.	9
333	6	0	P-H strs	A	Mesa	P-J park	6940	SE	150	.	.	4
333	7	0	P-H feats	A	Mesa	P-J park	6940	360	2250	3	.	.
333	8	0	P-H strs	A	Mesa	P-J park	6940	E	100	.	.	1
333	9	0	P-H strs	A	Mesa	P-J park	6940	E	250	.	.	2
333	10	0	P-H feats	A	Mesa	P-J park	6940	360	240	3	.	.
333	11	0	P-H strs	A	Mesa	P-J park	6940	E	600	.	.	7
333	12	0	P-H strs	A	Mesa	P-J park	6940	E	2400	.	.	16
333	13	0	P-H strs	A	Mesa	P-J park	6940	N	150	.	.	5
333	14	0	P-H str/ft	A	Mesa	P-J park	6940	W	40	2	.	0
333	15	0	P-H strs	A	Mesa	P-J park	6940	W	50	.	.	2
333	16	0	P-H str/ft	A	Mesa	P-J park	6940	W	150	2	.	2
333	17	0	P-H strs	A	Mesa	P-J park	6940	W	50	.	.	2
333	18	0	P-H strs	A	Mesa	P-J park	6940	W	50	.	.	2
333	19	0	P-H strs	A	Mesa	P-J park	6940	W	150	.	.	6
333	20	0	P-H strs	A	Mesa	P-J park	6940	W	100	.	.	3
333	21	0	P-H strs	A	Mesa	P-J park	6940	W	200	.	.	8
333	22	0	P-H strs	A	Mesa	P-J park	6940	W	200	.	.	5
333	23	0	P-H strs	A	Mesa	P-J park	6940	W	25	.	.	1
333	24	0	P-H strs	A	Mesa	P-J park	6940	W	15	.	.	1
333	25	0	P-H feats	A	Mesa	P-J park	6940	360	270	7	.	.
333	26	0	P-H feats	A	Mesa	P-J park	6940	360	480	3	.	.
333	27	0	P-H feats	A	Mesa	P-J park	6940	360	770	8	.	.
335	1	0	P-H str/ft	C	Bench	Grass	6840	S	560000	0	.	0
429	1	0	P-H feats	D	Hill slope	Grass	6480	SE	6400	3	.	.
429	2	0	P-H strs	D	Hill slope	Scrub	6480	SE	200	.	.	4
449	1	514	P-H feats	C	Ridge	Scrub	6835	SE	2500	2	.	.
450	1	514	P-H str/ft	C	Ridge	Scrub	6840	NW	540	1	.	2
451	1	514	P-H feats	C	Ridge	P-J park	6820	W	60	1	.	.
452	1	514	L-scat	C	Ridge	P-J wood	6820	360	289	.	.	.

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/prov area	Pre-hist feats	Hist feats	Struc-tural feats
452	2	514	P-H feats	C	Ridge	P-J wood	6820	N	924	4	.	.
452	3	514	P-H feats	C	Ridge	P-J wood	6820	N	800	3	.	.
452	4	514	P-H feats	C	Ridge	P-J wood	6820	SE	1485	3	.	.
452	5	514	P-H feats	C	Ridge	P-J wood	6820	E	1880	3	.	.
452	6	514	L-scat	C	Ridge	P-J wood	6815	E	414	.	.	.
452	7	514	L-scat	C	Ridge	P-J wood	6820	360	300	.	.	.
452	8	514	L-scat	C	Ridge	P-J wood	6830	360	50	.	.	.
453	1	514	P-H str/ft	C	Ridge	P-J wood	6815	NE	440	2	.	3
454	1	517	P-H feats	C	Canyon floor	Marsh	6815	W	4250	1	.	.
455	1	517	L/C scat	C	Flood/valley	Marsh	6820	W	1000	.	.	.
456	1	64	P-H strs	D	Plain/flat	Scrub	6770	NE	2000	.	.	2
457	1	64	P-H feats	D	Plain/flat	Grass	6760	N	1800	1	.	.
458	1	393	P-H feats	C	Ridge	J-P wood	6810	N	6250	5	.	.
459	1	393	P-H feats	C	Ridge	P-J wood	6820	W	36	1	.	.
460	1	393	C-scat	C	Ridge	P-J wood	6760	NE	400	.	.	.
461	1	437	L/C scat	C	Ridge	P-J wood	6720	N	1125	.	.	.
462	1	437	P-H str/ft	C	Ridge	P-J wood	6720	NE	2400	1	.	15
464	1	244	L/C scat	C	Hill slope	P-J wood	6875	SE	900	.	.	.
465	1	263	Hist strs	D	Plain/flat	Scrub	6830	NE	2400	.	5	2
466	1	8	Hist strs	D	Hill slope	P-J park	6860	E	25	.	.	1
468	1	0	L/C scat	A	Mesa	P-J wood	7095	W	400	.	.	.
468	2	0	P-H str/ft	A	Mesa	P-J wood	7095	W	1200	2	.	2
469	1	0	P-H strs	C	Ridge	P-J park	7040	N	1250	.	.	3
470	1	35	P-H feats	C	Ridge	P-J wood	6875	NW	200	1	.	.
471	1	35	P-H str/ft	C	Ridge	P-J wood	6845	N	8000	1	.	2
472	1	0	P-H strs	C	Ridge	P-J park	6800	360	2070	.	.	42
472	2	0	P-H strs	C	Ridge	P-J park	6800	S	444	.	.	32
472	3	0	P-H str/ft	C	Ridge	P-J park	6800	360	624	1	.	35
472	4	0	P-H str/ft	C	Ridge	P-J park	6800	S	1386	2	.	15
472	5	0	P-H str/ft	C	Ridge	P-J park	6800	S	800	1	.	16
472	6	0	P-H str/ft	C	Ridge	P-J park	6800	360	540	1	.	4
472	7	0	P-H str/ft	C	Ridge	P-J park	6800	S	800	1	.	11
472	8	0	P-H str/ft	C	Ridge	P-J park	6800	S	2800	2	.	12
472	9	0	P-H strs	C	Ridge	Scrub	6780	360	81	.	.	9
472	10	0	P-H str/ft	C	Ridge	Scrub	6780	360	442	1	.	4
473	1	156	P-H str/ft	C	Ridge	Scrub	6990	E	2400	1	.	15
474	1	157	L/C scat	C	Talus base	Scrub	6940	NE	1000	.	.	.
475	1	157	L/C scat	C	Ridge	Scrub	6920	S	800	.	.	.
476	1	162	P-H str/ft	C	Hill slope	P-J wood	6960	E	300	1	.	8
477	1	162	P-H feats	C	Cliff/scarp	P-J wood	6990	S	450	2	.	.
478	1	162	P-H feats	C	Hill slope	P-J wood	6940	E	4200	1	.	.
479	1	162	P-H str/ft	C	Ridge	Scrub	6920	SE	400	1	.	1
480	1	162	P-H str/ft	C	Ridge	P-J wood	6910	SE	180	1	.	2
481	1	0	P-H strs	D	Ridge	Grass	6900	SE	4000	.	.	51
482	1	35	C-scat	C	Arroyo/wash	P-J wood	6835	SW	750	.	2	.

Table A3.1: Site/Architecture Inventory: General Observations (Continued)

Site no	Prov unit	Sample unit	Gen site class	Env'l zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/prov area	Pre-hist feats	Hist feats	Struc-tural feats
483	1	39	P-H strs	C	Ridge	P-J park	7040	SE	1250	.	.	3
484	1	38	Hist strs	C	Ridge	P-J park	6800	NE	1800	.	6	2
485	1	0	L-scat	D	Arroyo/wash	P-J wood	6830	SE	.	.	.	.
485	2	0	Hist strs	D	Arroyo/wash	P-J wood	6830	SE	7700	.	7	3
486	1	7	P-H feats	A	Mesa	P-J wood	7400	N	15	4	.	.
486	2	7	P-H feats	A	Mesa	P-J wood	7400	360	8	1	.	.
486	3	7	L/C scat	A	Mesa	P-J wood	7400	360	30	.	.	.
486	4	7	L-scat	A	Mesa	P-J wood	7400	360	10	.	.	.
486	5	7	P-H feats	A	Mesa	P-J wood	7400	360	1	1	.	.
486	6	7	P-H feats	A	Mesa	P-J wood	7400	360	1	1	.	.
486	7	7	P-H feats	A	Mesa	P-J wood	7400	360	10	2	.	.
486	8	7	L/C scat	A	Mesa	P-J wood	7400	360	35	.	.	.
486	9	7	P-H feats	A	Mesa	P-J wood	7400	360	1	1	.	.
486	10	7	P-H feats	A	Mesa	P-J wood	7400	360	6	1	.	.
487	1	7	L/C scat	A	Mesa	P-J wood	7400	S	5050	.	.	.
488	1	86	L-scat	C	Ridge	P-J park	6800	E	1600	.	.	.
488	2	86	P-H feats	C	Ridge	P-J park	6800	E	100	1	.	.
489	1	86	L/C scat	C	Ridge	P-J wood	6810	NW	1750	.	.	.
490	1	41	P-H strs	C	Hill slope	P-J park	6890	SE	4200	.	.	2
491	1	44	P-H feats	C	Ridge	P-J park	6910	E	1050	1	.	.
492	1	44	P-H feats	C	Hill slope	P-J park	6970	SE	450	1	.	.
493	1	247	L/C scat	D	Ridge	P-J park	6760	SE	9975	.	.	.
494	1	234	L-scat	C	Ridge	P-J wood	6850	NW	900	.	.	.
495	1	234	P-H feats	C	Hill slope	P-J wood	6880	NW	9	3	.	.
495	2	234	L-scat	C	Hill slope	P-J wood	6760	NW	30	.	.	.
495	3	234	L-scat	C	Hill slope	P-J wood	6760	NW	25	.	.	.
495	4	234	L-scat	C	Hill slope	P-J wood	6760	NW	20	.	.	.
496	1	243	L-scat	D	Ridge	P-J park	6815	W	600	.	.	.
497	1	556	Hist strs	D	Ridge	P-J park	6730	NW	7700	.	10	1
498	1	533	Hist strs	C	Ridge	P-J park	6920	SE	400	.	.	1
498	2	533	L/C scat	C	Ridge	P-J park	6920	SE	225	.	.	.
499	1	533	L/C scat	C	Arroyo/wash	P-J wood	6900	SW	1000	.	.	.
500	1	533	Hist strs	C	Plain/flat	P-J park	6910	S	3150	.	4	4
										===	==	===
										332	60	797

Table A3.2: Site/Architecture Inventory: Prehistoric Features

Site no	Prov unit	Sample unit	Gen site class	Hearths	Ash/ FCR	Middens	Pit struc- tures	Water control feats	Rock art feats	Rub- ble feats	Other feats	Total feats	Site/ prov area	Mean midden area	Mean pit str diam
185	1	0	P-H str/ft	.	.	1	6	.	.	.	.	7	29600	999	6
226	1	153	P-H feats	1	1	.	.	.	.	.	.	2	560	.	.
227	1	150	P-H str/ft	1	.	.	.	.	.	.	.	1	1350	.	.
228	1	150	P-H str/ft	.	1	1	1	.	.	.	.	3	1000	176	16
230	1	163	P-H feats	1	.	.	.	.	.	.	.	1	1250	.	.
231	1	163	P-H feats	.	.	.	.	4	.	.	.	4	900	.	.
233	1	163	P-H str/ft	.	.	1	.	.	.	.	.	1	1000	64	.
234	2	163	P-H feats	.	1	.	.	.	.	.	.	1	100	.	.
234	3	163	P-H feats	.	1	.	.	.	.	.	.	1	4500	.	.
235	1	163	P-H str/ft	.	.	1	.	.	.	.	.	1	1500	100	.
236	1	133	P-H feats	2	1	.	.	.	.	.	.	3	25	.	.
237	1	133	P-H feats	4	1	.	.	.	.	.	.	5	3400	.	.
238	1	133	P-H feats	3	.	.	.	.	.	.	.	3	1012	.	.
243	1	133	P-H feats	3	.	.	.	.	.	.	.	3	8055	.	.
245	1	230	P-H feats	.	3	.	.	.	.	.	.	3	7280	.	.
246	1	230	P-H feats	.	6	.	.	.	.	.	.	6	11700	.	.
246	2	230	P-H feats	.	1	.	.	.	.	.	.	1	45	.	.
247	1	546	P-H str/ft	1	.	.	.	.	.	.	.	1	625	.	.
247	2	546	P-H feats	.	.	.	.	.	.	2	.	2	225	.	.
248	1	546	P-H str/ft	.	.	1	.	.	.	.	.	1	3600	400	.
251	1	545	P-H str/ft	1	.	.	.	.	.	1	.	2	1000	.	.
252	1	406	P-H feats	.	3	.	.	.	.	.	.	3	3900	.	.
253	1	406	P-H str/ft	.	1	1	.	.	.	1	.	3	1000	40	.
254	1	414	P-H feats	.	.	.	.	.	.	1	.	1	805	.	.
257	1	0	P-H feats	.	.	.	.	.	2	.	.	2	150	.	.
263	1	0	P-H str/ft	.	.	1	.	.	.	.	.	1	7000	999	.
263	2	0	P-H str/ft	.	.	1	.	.	.	.	.	1	2500	375	.
263	3	0	P-H str/ft	.	.	1	.	.	.	.	.	1	2500	875	.
264	1	520	P-H feats	.	1	.	.	.	.	.	.	1	900	.	.
264	2	520	P-H feats	.	1	.	.	.	.	.	.	1	100	.	.
265	1	520	P-H feats	.	1	.	.	.	.	.	.	1	3500	.	.
266	1	515	P-H feats	.	.	1	.	.	.	.	.	1	100	100	.
266	2	515	P-H str/ft	.	.	1	2	.	.	2	.	5	1500	100	6
267	1	515	P-H feats	.	2	.	.	.	.	.	.	2	3200	.	.
268	1	520	P-H feats	.	1	.	.	.	.	.	.	1	21	.	.
268	2	520	P-H feats	.	1	.	.	.	.	.	.	1	63	.	.
268	3	520	P-H feats	.	1	.	.	.	.	.	.	1	169	.	.
268	4	520	P-H feats	.	1	.	.	.	.	.	.	1	9	.	.
268	5	520	P-H feats	.	1	.	.	.	.	.	.	1	9	.	.
268	6	520	P-H feats	.	1	.	.	.	.	.	.	1	88	.	.
268	7	520	P-H feats	.	1	.	.	.	.	.	.	1	12	.	.
268	8	520	P-H feats	.	1	.	.	.	.	.	.	1	56	.	.
268	9	520	P-H feats	.	1	.	.	.	.	.	.	1	36	.	.
268	10	520	P-H feats	.	1	.	.	.	.	.	.	1	4	.	.
268	11	520	P-H feats	.	1	.	.	.	.	.	.	1	4	.	.

Table A3.2: Site/Architecture Inventory: Prehistoric Features (Continued)

Site no	Prov unit	Sample unit	Gen site class	Hearths	Ash/ FCR	Middens	Pit struc- tures	Water control feats	Rock art feats	Rub- ble feats	Other feats	Total feats	Site/ prov area	Mean midden area	Mean pit str diam
268	12	520	P-H feats	.	1	.	.	.	.	.	.	1	16	.	.
268	13	520	P-H feats	.	1	.	.	.	.	.	.	1	36	.	.
268	14	520	P-H feats	.	1	.	.	.	.	.	.	1	16	.	.
268	15	520	P-H feats	.	1	.	.	.	.	.	.	1	8	.	.
268	16	520	P-H feats	.	1	.	.	.	.	.	.	1	8	.	.
269	1	520	P-H feats	.	1	.	.	.	.	.	.	1	100	.	.
270	2	438	P-H str/ft	.	.	1	.	.	.	.	1	2	2250	.	.
270	5	438	P-H str/ft	1	.	.	.	.	.	.	.	1	1500	.	.
270	6	438	P-H str/ft	0	.	.	.	.	.	.	0	0	10000	.	.
270	7	438	P-H str/ft	.	.	1	.	.	.	.	.	1	.	.	.
270	8	438	P-H str/ft	0	.	.	.	.	.	.	0	0	.	.	.
270	10	438	P-H str/ft	.	0	.	.	.	.	.	.	0	900	.	.
270	11	438	P-H str/ft	.	.	0	.	.	.	.	.	0	1600	.	.
270	12	438	P-H str/ft	.	0	.	0	.	.	7	.	7	1400	.	.
270	13	438	P-H str/ft	.	.	.	0	.	.	.	.	0	800	.	.
270	14	438	P-H str/ft	.	.	.	0	.	.	0	.	0	400	.	.
270	15	438	P-H str/ft	.	.	0	0	.	.	0	.	0	5000	.	.
270	16	438	P-H str/ft	.	.	.	.	.	.	0	.	0	400	.	.
270	17	438	P-H str/ft	.	.	2	2	.	.	.	.	4	4000	.	.
270	18	438	P-H str/ft	3	.	2	1	.	.	2	.	8	8000	.	.
270	19	438	P-H feats	.	.	.	1	.	.	.	.	1	140	.	.
270	20	438	P-H str/ft	1	.	1	.	.	.	.	.	2	10000	.	.
272	1	187	P-H feats	1	.	.	.	.	.	.	.	1	2500	.	.
273	1	187	P-H str/ft	1	.	.	.	.	.	1	.	2	35	.	.
273	4	187	P-H feats	.	.	2	.	.	.	.	.	2	500	90	.
274	1	187	P-H feats	.	1	1	11	.	.	.	1	14	28000	500	.
275	3	187	P-H str/ft	.	.	1	.	.	.	.	.	1	100	25	.
276	1	187	P-H feats	.	6	.	5	.	.	.	.	11	7700	.	0
278	1	187	P-H feats	.	1	.	.	.	.	.	.	1	450	.	.
278	2	187	P-H feats	.	1	.	.	.	.	.	.	1	250	.	.
278	3	187	P-H feats	.	1	.	.	.	.	1	.	2	110	.	.
278	5	187	P-H feats	.	1	.	.	.	.	.	.	1	96	.	.
278	6	187	P-H feats	.	1	.	.	.	.	.	.	1	90	.	.
278	7	187	P-H feats	.	1	.	.	.	.	.	.	1	63	.	.
278	8	187	P-H feats	.	1	.	.	.	.	.	.	1	1	.	.
278	9	187	P-H feats	.	1	.	.	.	.	.	.	1	240	.	.
278	10	187	P-H feats	.	1	.	.	.	.	.	.	1	6	.	.
278	11	187	P-H feats	.	1	.	.	.	.	.	.	1	72	.	.
278	12	187	P-H feats	.	1	.	.	.	.	.	.	1	15	.	.
278	13	187	P-H feats	.	1	.	.	.	.	.	.	1	8	.	.
278	14	187	P-H feats	.	1	.	.	.	.	.	.	1	4	.	.
278	15	187	P-H feats	.	1	.	.	.	.	.	.	1	4	.	.
278	16	187	P-H feats	.	1	.	.	.	.	.	.	1	4	.	.
278	17	187	P-H feats	.	0	.	.	.	.	.	.	0	160	.	.
279	1	187	P-H str/ft	.	.	.	.	.	.	.	1	1	1750	.	.

Table A3.2: Site/Architecture Inventory: Prehistoric Features (Continued)

Site no	Prov unit	Sample unit	Gen site class	Hearths	Ash/ FCR	Middens	Pit struc-tures	Water control feats	Rock art feats	Rub-ble feats	Other feats	Total feats	Site/ prov area	Mean midden area	Mean pit str diam
280	1	191	P-H str/ft	.	3	.	.	1	.	.	.	4	1200	.	.
280	5	191	P-H feats	.	11	.	.	.	.	.	.	11	1800	.	.
281	1	191	P-H feats	.	1	.	.	.	.	.	.	1	506	.	.
290	1	0	P-H str/ft	1	.	.	.	.	.	.	.	1	3600	.	.
291	1	40	P-H str/ft	.	.	1	.	.	.	.	.	1	648	260	.
291	2	40	P-H feats	.	2	1	.	.	.	1	.	4	1020	750	.
291	3	40	P-H feats	.	.	.	.	.	.	1	.	1	640	.	.
293	1	40	P-H feats	.	.	.	.	.	.	1	.	1	903	.	.
294	1	40	P-H feats	.	9	.	.	.	.	1	.	10	4500	.	.
295	1	40	P-H feats	1	.	.	.	.	.	1	.	2	300	.	.
311	1	533	P-H feats	.	4	.	.	.	.	.	.	4	1600	.	.
311	2	533	P-H feats	.	2	.	.	.	.	.	.	2	150	.	.
312	1	533	P-H feats	.	3	.	.	.	.	.	.	3	600	.	.
314	1	442	P-H str/ft	.	.	1	.	.	.	.	.	1	1350	600	.
316	1	442	P-H feats	.	.	.	1	.	.	.	.	1	400	.	.
324	1	331	P-H feats	.	.	.	.	.	.	1	.	1	1400	.	.
327	1	331	P-H str/ft	.	.	1	.	.	.	1	.	2	1200	100	.
327	2	331	P-H str/ft	.	.	.	.	.	.	1	.	1	400	.	.
328	2	191	P-H feats	.	1	.	.	.	.	.	.	1	72	.	.
328	3	191	P-H feats	.	3	.	.	.	.	.	.	3	525	.	.
328	4	191	P-H feats	.	3	.	.	.	.	.	.	3	750	.	.
329	1	191	P-H str/ft	1	.	.	.	.	.	.	.	1	1200	.	.
330	1	0	P-H str/ft	.	.	2	.	.	.	1	.	3	8000	999	.
330	2	0	P-H str/ft	1	.	1	.	.	.	.	.	2	2000	400	.
330	3	0	P-H str/ft	.	.	1	.	.	.	2	.	3	4800	600	.
331	2	0	P-H feats	.	.	1	.	.	.	.	.	1	384	384	.
331	4	0	P-H feats	.	.	1	.	.	.	.	.	1	432	432	.
331	6	0	P-H feats	.	.	.	.	1	.	.	.	1	900	.	.
333	7	0	P-H feats	.	.	.	3	.	.	.	.	3	2250	.	.
333	10	0	P-H feats	1	2	.	.	.	.	.	.	3	240	.	.
333	14	0	P-H str/ft	.	.	.	.	.	.	2	.	2	40	.	.
333	16	0	P-H str/ft	.	.	.	.	.	2	.	.	2	150	.	.
333	25	0	P-H feats	.	7	.	.	.	.	.	.	7	270	.	.
333	26	0	P-H feats	.	3	.	.	.	.	.	.	3	480	.	.
333	27	0	P-H feats	.	8	.	.	.	.	.	.	8	770	.	.
335	1	0	P-H str/ft	0	0	0	0	.	.	0	.	0	560000	.	.
429	1	0	P-H feats	.	1	.	.	.	1	1	.	3	6400	.	.
449	1	514	P-H feats	.	2	.	.	.	.	.	.	2	2500	.	.
450	1	514	P-H str/ft	.	1	.	.	.	.	.	.	1	540	.	.
451	1	514	P-H feats	.	1	.	.	.	.	.	.	1	60	.	.
452	2	514	P-H feats	.	4	.	.	.	.	.	.	4	924	.	.
452	3	514	P-H feats	.	3	.	.	.	.	.	.	3	800	.	.
452	4	514	P-H feats	.	3	.	.	.	.	.	.	3	1485	.	.
452	5	514	P-H feats	.	3	.	.	.	.	.	.	3	1880	.	.
453	1	514	P-H str/ft	.	.	1	.	.	.	.	1	2	440	100	.

Table A3.2: Site/Architecture Inventory: Prehistoric Features (Continued)

Site no	Prov unit	Sample unit	Gen site class	Hearths	Ash/ FCR	Middens	Pit struc-tures	Water control feats	Rock art feats	Rub-ble feats	Other feats	Total feats	Site/ prov area	Mean midden area	Mean pit str diam
454	1	517	P-H feats	.	1	.	.	.	.	.	.	1	4250	.	.
457	1	64	P-H feats	.	.	.	.	.	.	1	.	1	1800	.	.
458	1	393	P-H feats	.	5	.	.	.	.	.	.	5	6250	.	.
459	1	393	P-H feats	1	.	.	.	.	.	.	.	1	36	.	.
462	1	437	P-H str/ft	.	.	1	.	.	.	.	.	1	2400	100	.
468	2	0	P-H str/ft	.	.	1	.	.	.	1	.	2	1200	.	.
470	1	35	P-H feats	1	.	.	.	.	.	.	.	1	200	.	.
471	1	35	P-H str/ft	.	.	.	.	.	.	.	1	1	8000	.	.
472	3	0	P-H str/ft	.	.	1	.	.	.	.	.	1	624	360	.
472	4	0	P-H str/ft	.	.	1	.	.	.	1	.	2	1386	400	.
472	5	0	P-H str/ft	.	.	1	.	.	.	.	.	1	800	64	.
472	6	0	P-H str/ft	.	.	1	.	.	.	.	.	1	540	400	.
472	7	0	P-H str/ft	.	.	1	.	.	.	.	.	1	800	225	.
472	8	0	P-H str/ft	.	.	1	.	.	1	.	.	2	2800	400	.
472	10	0	P-H str/ft	.	.	.	.	.	1	.	.	1	442	.	.
473	1	156	P-H str/ft	.	.	1	.	.	.	.	.	1	2400	225	.
476	1	162	P-H str/ft	.	.	1	.	.	.	.	.	1	300	.	.
477	1	162	P-H feats	.	.	.	.	.	2	.	.	2	450	.	.
478	1	162	P-H feats	.	.	.	.	.	.	1	.	1	4200	.	.
479	1	162	P-H str/ft	.	.	.	.	.	.	1	.	1	400	.	.
480	1	162	P-H str/ft	.	.	.	.	.	.	1	.	1	180	.	.
486	1	7	P-H feats	3	1	.	.	.	.	.	.	4	15	.	.
486	2	7	P-H feats	.	1	.	.	.	.	.	.	1	8	.	.
486	5	7	P-H feats	1	.	.	.	.	.	.	.	1	1	.	.
486	6	7	P-H feats	1	.	.	.	.	.	.	.	1	1	.	.
486	7	7	P-H feats	.	2	.	.	.	.	.	.	2	10	.	.
486	9	7	P-H feats	.	1	.	.	.	.	.	.	1	1	.	.
486	10	7	P-H feats	.	1	.	.	.	.	.	.	1	6	.	.
488	2	86	P-H feats	.	1	.	.	.	.	.	.	1	100	.	.
491	1	44	P-H feats	.	.	.	.	.	.	1	.	1	1050	.	.
492	1	44	P-H feats	.	1	.	.	.	.	.	.	1	450	.	.
495	1	234	P-H feats	.	3	.	.	.	.	.	.	3	9	.	.
				==	===	==	==	=	=	==	=	===			
				36	161	43	33	6	9	39	5	332			

Table A3.3: Site/Architecture Inventory: Historic Features

Site no	Prov unit	Sample unit	Gen site class	Corrals	Trash	Wind-mills	Ovens	Hearths	Out-bldgs	Water tanks	Other feats	Total feats	Site/prov area	Mean midden area
185	1	0	P-H str/ft	.	1	.	.	.	.	.	.	1	29600	999
242	1	133	L/C scat	.	.	.	.	.	.	.	1	1	325	.
242	2	133	Hist fea/scat	.	.	.	.	1	.	.	.	1	1000	.
259	1	467	Hist strs	1	.	.	.	.	.	.	.	1	900	.
269	2	520	Hist fea/scat	1	.	.	.	.	.	.	.	1	1600	.
271	1	0	Hist strs	2	1	1	.	1	2	2	4	13	8800	500
282	1	140	Hist fea/scat	.	.	.	.	.	.	.	3	3	2000	.
315	1	442	Hist fea/scat	.	.	.	.	.	.	.	1	1	150	.
320	1	538	Hist strs	.	.	.	.	.	.	.	1	1	400	.
321	2	418	Hist fea/scat	.	.	.	.	.	.	.	2	2	400	.
331	6	0	P-H feats	.	.	.	.	.	.	1	.	1	900	.
465	1	263	Hist strs	1	1	1	.	.	.	1	1	5	2400	.
482	1	35	C-scat	1	.	.	.	1	.	.	.	2	750	.
484	1	38	Hist strs	1	1	1	1	.	1	.	1	6	1800	.
485	2	0	Hist strs	1	1	1	1	.	.	.	3	7	7700	.
497	1	556	Hist strs	7	1	.	.	.	.	.	2	10	7700	.
500	1	533	Hist strs	1	.	.	.	2	1	.	.	4	3150	.
				==	=	=	=	=	=	=	==	==		
				16	6	4	2	5	4	4	19	60		

Table A3.4: Site/Architecture Inventory: Structural Features

Site no	Prov unit	Sample unit	Gen site class	Str ID	Total rooms	Const'n ele-ments	Const'n type	Ground plan	Max length	Max width	Kivas	Plazas	Total feats	Avg kiva diam
185	1	0	P-H str/ft	1	20	Slabs	Indet	Irregular	30	22	3	.	23	6
227	1	150	P-H str/ft	1	8	Irr blocks	Simp msnry	Irregular	12	11	.	.	8	.
228	1	150	P-H str/ft	1	5	Irr blocks	Simp msnry	Square	12	10	.	.	5	.
233	1	163	P-H str/ft	1	9	Msnry/jacal	Simp msnry	L-shape	15	8	.	.	9	.
234	1	163	P-H strs	1	2	Irr blocks	Found'n	Rect	5	3	.	.	2	.
235	1	163	P-H str/ft	1	15	Irr blocks	Simp msnry	Rect	16	10	.	.	15	.
239	1	133	P-H strs	1	1	Basalt/blks	Found'n	Circular	3	2	.	.	1	.
247	1	546	P-H str/ft	1	2	Irr blocks	Found'n	Rect	6	3	.	.	2	.
248	1	546	P-H str/ft	1	7	Basalt/blks	Simp msnry	Irregular	20	10	.	.	7	.
251	1	545	P-H str/ft	1	1	Slabs	Found'n	Rect	3	2	.	.	1	.
253	1	406	P-H str/ft	1	3	Irr blocks	Found'n	Rect	11	3	.	.	3	.
255	1	414	P-H strs	1	1	Irr blocks	Found'n	Rect	5	3	.	.	1	.
256	1	414	Hist strs	1	1	Rough logs	Log	Rect	5	5	.	.	1	.
259	1	467	Hist strs	1	1	Slabs	Compd msnry	Rect	5	4	.	.	1	.
262	1	0	P-H strs	1	4	N/A	N/A	N/A	16	4	.	.	4	.
263	1	0	P-H str/ft	1	45	Msnry/jacal	Simp msnry	Irregular	45	25	1	1	47	8
263	2	0	P-H str/ft	1	9	Basalt/cobs	Found'n	Rect	25	8	0	.	9	.
263	3	0	P-H str/ft	1	.	Adobe(/jacal)	Adobe	Rect	35	20	0	.	0	.
266	2	515	P-H str/ft	1	.	Basalt/cobs	Found'n	Rect	10	10	.	.	0	.
270	2	438	P-H str/ft	1	.	Msnry/jacal	Found'n	Indet	.	.	.	.	0	.
270	3	438	P-H strs	1	1	Slb/msnry/jac	Found'n	Square	.	.	.	.	1	.
270	5	438	P-H str/ft	1	2	Slabs	Simp msnry	Rect	8	3	.	.	2	.
270	6	438	P-H str/ft	1	.	Uprt slabs	Simp msnry	Indet	.	.	.	.	0	.
270	7	438	P-H str/ft	1	3	Uprt slabs	Simp msnry	Indet	.	.	.	.	3	.
270	8	438	P-H str/ft	1	.	Uprt slabs	Simp msnry	Indet	.	.	.	.	0	.
270	9	438	P-H strs	1	5	Msnry/jacal	Simp msnry	Rect	21	3	.	.	5	.
270	10	438	P-H str/ft	1	.	Uprt slabs	Indet	Indet	.	.	.	.	0	.
270	11	438	P-H str/ft	1	5	Uprt slabs	Indet	Indet	.	.	.	.	5	.
270	12	438	P-H str/ft	1	.	Jacal	Indet	Indet	.	.	.	.	0	.
270	13	438	P-H str/ft	1	.	Jacal	Indet	Indet	.	.	.	.	0	.
270	14	438	P-H str/ft	1	.	Uprt slabs	Found'n	Indet	.	.	.	.	0	.
270	15	438	P-H str/ft	1	.	Slb/uprt slb	Indet	Indet	.	.	.	.	0	.
270	16	438	P-H str/ft	1	.	Uprt slabs	Indet	Indet	.	.	.	.	0	.
270	17	438	P-H str/ft	1	.	Msnry/jacal	Simp msnry	L-shape	10	8	.	.	0	.
270	18	438	P-H str/ft	1	2	Irr blocks	Simp msnry	Rect	8	4	.	.	2	.
270	20	438	P-H str/ft	1	33	Shpd blk/jac	Simp msnry	Irregular	46	24	3	.	36	7
270	21	438	P-H strs	1	2	Jacal	Found'n	Rect	10	3	.	.	2	.
270	22	438	P-H strs	1	2	Msnry/jacal	Found'n	Rect	8	3	.	.	2	.
271	1	0	Hist strs	1	5	Rough logs	Log	Irregular	25	8	.	.	5	.
273	1	187	P-H str/ft	1	2	Basalt/cobs	Simp msnry	Rect	6	3	.	.	2	.
273	2	187	P-H strs	1	2	Bslt/cob/jac	Simp msnry	Rect	6	3	.	.	2	.
273	3	187	P-H strs	1	1	Basalt/cobs	Simp msnry	Rect	3	3	.	.	1	.
275	1	187	P-H strs	1	1	Basalt/cobs	Simp msnry	Rect	5	4	.	.	1	.
275	2	187	P-H strs	1	1	Bslt/cob/jac	Found'n	Square	3	3	.	.	1	.
275	3	187	P-H str/ft	1	4	Basalt/cobs	Simp msnry	Rect	8	4	.	.	4	.

Table A3.4: Site/Architecture Inventory: Structural Features (Continued)

Site no	Prov unit	Sample unit	Gen site class	Str ID	Total rooms	Const'n ele-ments	Const'n type	Ground plan	Max length	Max width	Kivas	Plazas	Total feats	Avg kiva diam
279	1	187	P-H str/ft	1	1	Basalt/blks	Simp msnry	Rect	7	4	.	.	1	.
280	1	191	P-H str/ft	1	6	Basalt/cobs	Found'n	Rect	15	10	.	.	6	.
280	2	191	P-H strs	1	2	Basalt/cobs	Found'n	Irregular	8	5	.	.	2	.
280	3	191	P-H strs	1	6	Basalt/cobs	Found'n	Rect	9	6	.	.	6	.
280	4	191	P-H strs	1	2	Basalt/cobs	Found'n	Rect	8	4	.	.	2	.
281	2	191	P-H strs	1	.	Basalt/cobs	Indet	Indet	10	3	.	.	0	.
290	1	0	P-H str/ft	1	4	Slabs	Simp msnry	Indet	5	5	.	.	4	.
291	1	40	P-H str/ft	1	14	Slabs	Simp msnry	Rect	14	10	.	.	14	.
296	1	40	P-H strs	1	2	Slabs	Found'n	Rect	6	2	.	.	2	.
314	1	442	P-H str/ft	1	7	Slb/msnry/jac	Compd msnry	Square	13	10	.	.	7	.
318	1	538	P-H strs	1	2	Basalt/blks	Simp msnry	Rect	4	3	.	.	2	.
320	1	538	Hist strs	1	1	Irr blocks	Compd msnry	Square	3	3	.	.	1	.
321	1	418	P-H strs	1	2	Irr blocks	Simp msnry	Rect	8	6	.	.	2	.
323	1	416	Hist strs	1	1	Irr blocks	Compd msnry	Rect	12	7	.	.	1	.
326	1	0	P-H strs	1	5	Basalt/blks	Found'n	Irregular	6	4	.	.	5	.
326	2	0	P-H strs	1	2	Bslt/cob/jac	Found'n	Rect	7	4	.	.	2	.
327	1	331	P-H str/ft	1	.	Irr blocks	Simp msnry	Rect	14	10	.	.	0	.
327	2	331	P-H str/ft	1	.	Irr blocks	Simp msnry	Rect	15	11	.	.	0	.
328	1	191	P-H strs	1	4	Basalt/cobs	Simp msnry	L-shape	8	8	.	.	4	.
329	1	191	P-H str/ft	1	3	Basalt/cobs	Found'n	Rect	8	3	.	.	3	.
330	1	0	P-H str/ft	1	10	Basalt/blks	Simp msnry	Rect	20	8	.	.	10	.
330	2	0	P-H str/ft	1	4	Basalt/blks	Simp msnry	Rect	20	6	1	.	5	15
330	3	0	P-H str/ft	1	21	Basalt/blks	Simp msnry	Rect	26	12	.	.	21	.
331	1	0	P-H strs	1	45	Slb/msnry/jac	Core/veneer	L-shape	70	38	1	.	46	6
331	3	0	P-H strs	1	4	Slb/msnry/jac	Core/veneer	Arc	25	23	1	.	5	21
331	5	0	P-H strs	1	.	N/A	N/A	N/A	100	90	.	1	1	.
331	7	0	P-H strs	1	2	Slb/msnry/jac	Compd msnry	Rect	5	3	.	.	2	.
333	1	0	P-H strs	1	15	Irr blocks	Simp msnry	Irregular	23	23	.	.	15	.
333	2	0	P-H strs	1	21	Irr blocks	Simp msnry	Irregular	40	18	.	.	21	.
333	3	0	P-H strs	1	7	Irr blocks	Simp msnry	L-shape	22	10	.	.	7	.
333	4	0	P-H strs	1	2	Irr blocks	Simp msnry	Rect	6	3	.	.	2	.
333	5	0	P-H strs	1	9	Irr blocks	Simp msnry	Irregular	30	15	.	.	9	.
333	6	0	P-H strs	1	4	Irr blocks	Simp msnry	L-shape	8	6	.	.	4	.
333	8	0	P-H strs	1	1	Irr blocks	Simp msnry	Square	8	8	.	.	1	.
333	9	0	P-H strs	1	2	Irr blocks	Simp msnry	Square	22	8	.	.	2	.
333	11	0	P-H strs	1	7	Irr blocks	Simp msnry	L-shape	25	15	.	.	7	.
333	12	0	P-H strs	1	16	Irr blocks	Simp msnry	Irregular	45	30	.	.	16	.
333	13	0	P-H strs	1	5	Irr blocks	Simp msnry	Irregular	10	6	.	.	5	.
333	14	0	P-H str/ft	1	.	Irr blocks	Simp msnry	Indet	8	2	.	.	0	.
333	15	0	P-H strs	1	2	Irr blocks	Simp msnry	Rect	8	3	.	.	2	.
333	16	0	P-H str/ft	1	2	Irr blocks	Simp msnry	Rect	10	8	.	.	2	.
333	17	0	P-H strs	1	2	Irr blocks	Simp msnry	L-shape	6	4	.	.	2	.
333	18	0	P-H strs	1	2	Irr blocks	Simp msnry	Rect	6	3	.	.	2	.
333	19	0	P-H strs	1	6	Irr blocks	Simp msnry	L-shape	13	6	.	.	6	.
333	20	0	P-H strs	1	3	Irr blocks	Simp msnry	L-shape	6	6	.	.	3	.

Table A3.4: Site/Architecture Inventory: Structural Features (Continued)

Site no	Prov unit	Sample unit	Gen site class	Str ID	Total rooms	Const'n ele-ments	Const'n type	Ground plan	Max length	Max width	Kivas	Plazas	Total feats	Avg kiva diam
333	21	0	P-H strs	1	8	Irr blocks	Simp msnry	Irregular	17	8	.	.	8	.
333	22	0	P-H strs	1	5	Irr blocks	Simp msnry	L-shape	12	8	.	.	5	.
333	23	0	P-H strs	1	1	Irr blocks	Simp msnry	Square	4	4	.	.	1	.
333	24	0	P-H strs	1	1	Irr blocks	Simp msnry	Square	3	3	.	.	1	.
335	1	0	P-H str/ft	1	.	Basalt/cobs	Indet	Indet	.	.	.	.	0	.
429	2	0	P-H strs	1	4	Shaped blks	Simp msnry	Rect	10	5	.	.	4	.
450	1	514	P-H str/ft	1	2	Basalt/blks	Simp msnry	Rect	17	12	.	.	2	.
453	1	514	P-H str/ft	1	3	Basalt/blks	Simp msnry	L-shape	10	4	.	.	3	.
456	1	64	P-H strs	1	2	Irr blocks	Simp msnry	Rect	7	3	.	.	2	.
462	1	437	P-H str/ft	1	15	Irr blocks	Simp msnry	Rect	14	10	.	.	15	.
465	1	263	Hist strs	1	2	Brd/bat/bark	Frame	Rect	.	.	.	.	2	.
466	1	8	Hist strs	1	1	Adobe(/jacal)	Adobe	Square	4	4	.	.	1	.
468	2	0	P-H str/ft	1	2	Irr blocks	Simp msnry	Irregular	6	2	.	.	2	.
469	1	0	P-H strs	1	3	Basalt/cobs	Simp msnry	Square	6	6	.	.	3	.
471	1	35	P-H str/ft	1	2	Basalt/blks	Simp msnry	Rect	5	3	.	.	2	.
472	1	0	P-H strs	1	38	Slabs	Core/veneer	Rect	46	45	4	.	42	10
472	2	0	P-H strs	1	32	Slabs	Compd msnry	L-shape	37	12	0	.	32	.
472	3	0	P-H str/ft	1	34	Slabs	Compd msnry	Square	26	24	1	.	35	5
472	4	0	P-H str/ft	1	12	Slabs	Compd msnry	Rect	18	5	3	.	15	10
472	5	0	P-H str/ft	1	13	Slabs	Compd msnry	Arc	32	10	3	.	16	10
472	6	0	P-H str/ft	1	4	Slabs	Compd msnry	Square	8	7	.	.	4	.
472	7	0	P-H str/ft	1	11	Slabs	Compd msnry	L-shape	20	10	.	.	11	.
472	8	0	P-H str/ft	1	10	Slabs	Compd msnry	L-shape	40	23	2	.	12	7
472	9	0	P-H strs	1	9	Slabs	Compd msnry	Square	9	9	.	.	9	.
472	10	0	P-H str/ft	1	4	Slabs	Compd msnry	Square	7	6	.	.	4	.
473	1	156	P-H str/ft	1	15	Slabs	Simp msnry	Irregular	15	12	.	.	15	.
476	1	162	P-H str/ft	1	8	Slabs	Simp msnry	Arc	.	.	.	.	8	.
479	1	162	P-H str/ft	1	1	Slabs	Simp msnry	Square	.	.	.	.	1	.
480	1	162	P-H str/ft	1	2	Irr blocks	Simp msnry	Rect	8	6	.	.	2	.
481	1	0	P-H strs	1	50	Shaped blks	Simp msnry	Wing rect	24	12	1	.	51	10
483	1	39	P-H strs	1	3	Basalt/blks	Simp msnry	Square	4	3	.	.	3	.
484	1	38	Hist strs	1	2	Adobe(/jacal)	Adobe	Rect	6	3	.	.	2	.
485	2	0	Hist strs	1	3	Slabs	Simp msnry	Square	14	5	.	.	3	.
490	1	41	P-H strs	1	2	Uprt slabs	Found'n	Rect	6	3	.	.	2	.
497	1	556	Hist strs	1	1	Irr blocks	Compd msnry	Rect	7	4	.	.	1	.
498	1	533	Hist strs	1	1	Adobe(/jacal)	Adobe	Rect	8	8	.	.	1	.
500	1	533	Hist strs	1	4	Jacal	Jacal(/adb)	Rect	13	10	.	.	4	.
					===						==	=	===	
					771						24	2	797	

Table A3.5: Historic Sites Inventory: General Observations

Site no	Prov unit	Sample unit	Gen site class	Topo zone	Terrain	Vegetation	Eleva-tion	Expo-sure	Site/prov area	Pre-hist feats	Hist feats	Struc-tural feats
242	2	133	Hist fea/scat	C	Hill slope	Scrub	6740	N	1000	.	1	.
256	1	414	Hist strs	D	Hill slope	P-J park	6940	S	100	.	.	1
259	1	467	Hist strs	C	Hill slope	P-J wood	6790	E	900	.	1	1
269	2	520	Hist fea/scat	C	Ridge	P-J wood	6830	S	1600	.	1	.
271	1	0	Hist strs	C	Ridge	P-J park	7060	S	8800	.	13	5
282	1	140	Hist fea/scat	C	Hill slope	P-J park	6820	E	2000	.	3	.
315	1	442	Hist fea/scat	C	Arroyo/wash	P-J wood	6920	NE	150	.	1	.
320	1	538	Hist strs	D	Flood/valley	Grass	6880	360	400	.	1	1
321	2	418	Hist fea/scat	C	Ridge	J-P wood	6820	360	400	.	2	.
323	1	416	Hist strs	D	Canyon floor	P-J park	6920	S	450	.	.	1
465	1	263	Hist strs	D	Plain/flat	Scrub	6830	NE	2400	.	5	2
466	1	8	Hist strs	D	Hill slope	P-J park	6860	E	25	.	.	1
484	1	38	Hist strs	C	Ridge	P-J park	6800	NE	1800	.	6	2
485	2	0	Hist strs	D	Arroyo/wash	P-J wood	6830	SE	7700	.	7	3
497	1	556	Hist strs	D	Ridge	P-J park	6730	NW	7700	.	10	1
498	1	533	Hist strs	C	Ridge	P-J park	6920	SE	400	.	.	1
500	1	533	Hist strs	C	Plain/flat	P-J park	6910	S	3150	.	4	4
										==	==	==
										??	55	23

Table A3.6: Historic Sites Inventory: Historic Features

Site no	Prov unit	Sample unit	Gen site class	Corrals	Trash	Wind-mills	Ovens	Hearths	Out-bldgs	Water tanks	Other feats	Total feats	Site/prov area	Mean midden area
242	2	133	Hist fea/scat	.	.	.	.	1	.	.	.	1	1000	.
259	1	467	Hist strs	1	.	.	.	.	.	.	.	1	900	.
269	2	520	Hist fea/scat	1	.	.	.	.	.	.	.	1	1600	.
271	1	0	Hist strs	2	1	1	.	1	2	2	4	13	8800	500
282	1	140	Hist fea/scat	.	.	.	.	.	.	.	3	3	2000	.
315	1	442	Hist fea/scat	.	.	.	.	.	.	.	1	1	150	.
320	1	538	Hist strs	.	.	.	.	.	.	.	1	1	400	.
321	2	418	Hist fea/scat	.	.	.	.	.	.	.	2	2	400	.
465	1	263	Hist strs	1	1	1	.	.	.	1	1	5	2400	.
484	1	38	Hist strs	1	1	1	1	.	1	.	1	6	1800	.
485	2	0	Hist strs	1	1	1	1	.	.	.	3	7	7700	.
497	1	556	Hist strs	7	1	.	.	.	.	.	2	10	7700	.
500	1	533	Hist strs	1	.	.	.	2	1	.	.	4	3150	.
				==	=	=	=	=	=	=	==	==		
				15	5	4	2	4	4	3	18	55		

Table A3.7: Historic Sites Inventory: Structural Features

Site no	Prov unit	Sample unit	Gen site class	Str ID	Total rooms	Const'n ele-ments	Const'n type	Ground plan	Max length	Max width
256	1	414	Hist strs	1	1	Rough logs	Log	Rect	5	5
259	1	467	Hist strs	1	1	Slabs	Compd msnry	Rect	5	4
271	1	0	Hist strs	1	5	Rough logs	Log	Irregular	25	8
320	1	538	Hist strs	1	1	Irr blocks	Compd msnry	Square	3	3
323	1	416	Hist strs	1	1	Irr blocks	Compd msnry	Rect	12	7
465	1	263	Hist strs	1	2	Brd/bat/bark	Frame	Rect	.	.
466	1	8	Hist strs	1	1	Adobe(/jacal)	Adobe	Square	4	4
484	1	38	Hist strs	1	2	Adobe(/jacal)	Adobe	Rect	6	3
485	2	0	Hist strs	1	3	Slabs	Simp msnry	Square	14	5
497	1	556	Hist strs	1	1	Irr blocks	Compd msnry	Rect	7	4
498	1	533	Hist strs	1	1	Adobe(/jacal)	Adobe	Rect	8	8
500	1	533	Hist strs	1	4	Jacal	Jacal(/adb)	Rect	13	10
					==					
					23					

Appendix 4

Lithic Analysis: Field Methods and Data Format

By Signa Larralde

Data Collection Strategy

Data Format

Two forms were employed during the project. The first (Figure A4.1) is an attribute coding form for chipped and groundstone that has the major advantage of separating chipped stone data down into eight basic attributes for most items (16 for chipped stone tools, six for groundstone items).

These attributes can be manipulated to yield reduction stage information, breakage information and use/wear information.

This format produces a flexible, descriptive data base designed for computer entry, and it demands few functional decisions of the coder. The form has been used extensively on other projects (cf. Ebert et al. 1983a) and the precision of the coded variables has been tested (Larralde 1984).

The major disadvantages of the form are that it is time-consuming (a maximum of 30 items can be recorded per coder per site, assuming that a total of no more than one hour per site is allotted for finding, flagging, and coding lithics) and assemblage characteristics are difficult to reconstruct intuitively because of the numerical code format.

The second lithics form has two parts (Figure A4.2). The front page is completed for every site and consists of a sample description and a narrative that stresses spatial distribution and the recorder's ideas and impressions about the assemblage.

The back page is completed in lieu of the code form on large sites. It has the advantage of summarizing the material and type composition of the entire assemblage in an easy-to-read tally format and is faster to complete than the code sheet (the maximum number of items that can be inventoried per coder in the situation specified above jumps to approximately 90).

The disadvantage is the loss of key attribute data for analyses of reduction sequence and tool breakage. Also, the "type" attribute was found to be relatively imprecise on a previous project's coder consistency test, with a 22.9 percent disagreement rate among coders (Larralde 1984). Another disadvantage is that data from the in-field lithic narrative/tally sheet must be subsequently coded in yet another format (Figure A4.3).

Both forms were continuously modified to reflect the kinds of objects frequently found in the project area.

Record for all items:

Column Variable

3-5 Site Number

6 Provenience/Grid Number

7-8 Material Type
- 01 cryptocrystallines
- 02 glassy volcanics
- 03 crystalline
- 04 metamorphics
- 05 other
- 10 chert
- 11 chalcedony
- 12 quartzite
- 13 sandstone

10-11 Length to the nearest 5mm

14-16 Width to the nearest 5mm

18-20 Thickness to the nearest 1mm

(record above measurements on whole flakes

22 Completeness
- 1 1/2
- 2 1/2
- 3 whole
- 4 not applicable
- 9 indeterminate

*Record for chipped stone:

31-32 Type
- 10 core
  - 11 bipolar
  - 12 single platform
  - 13 multiplatform
  - 14 blade core
  - 20 Angular debris
  - 30 Flake
  - 30 Flake
    - 31 biface thinning
    - 32 bipolar
    - 33 pressure flake
  - 40 Tested Cobble
  - 50 Biface
  - 51 Biface 1
  - 52 Biface 2
  - 53 Biface 3
- 60 Uniface
- 70 Other

Column Variable

34 Cortex
- 0 none
- 1 1/2
- 2 1/2
- 3 total
- 4 indeterminate

35 Dorsal Scar County
(9=9 and greater than 9)

36 Platform Characteristics
- 0 missing
- 1 cortical
- 2 crushed
- 3 single-facet non-cortical
- 4 multi-faceted non-cortical
- 5 ground
- 6 other
- 7 indeterminate

Record for tools:

37-38 Breakage
- 0 whole
- 1 tip
- 2 base
- 3 midsection
- 4 whole, tip crushed
- 5 whole, tip snapped
- 6 whole, base broken
- 7 reworked
- 8 base + midsection
- 9 tip + midsection
- 10 indeterminate fragment

39 Edge modification
- 1 unifacially utilized
- 2 bifacially utilized
- 3 unifacial marginal retouch
- 4 bifacial marginal retouch
- 5 ground

(For tools with more than 1 modified edge use a separate line for description of each edge.)

*Note for angular debris and proximal end flakes only cortex, completeness, and material type are recorded.

Figure A4.1: Chipped and Groundstone Coding Format

Record for Groundstone:

Column	Variable
51-52	Type
	10 Metate
	11 slab
	12 basin
	13 bedrock
	14 trough
	18 other, specify
	20 Mano
	21 ovate handstone
	22 Subrectangular handstone
	23 two-hand
	24 other, specify
	30 Mortar
	31 bedrock
	32 other, specify
	40 Pestle
	50 Hammerstone
	51 sphere
	52 disk
	53 oblong
	54 irregular
	55 other, specify
	60 Worked slab
	70 Abrader
	80 Polishing stone
54	Preparation
	0 none
	1 pecking on ground surface
	2 edges flaked/pecked
	3 grooved
	4 1 + 2 above
	5 other
	9 indeterminate
55	Worn surface
	1 unifacial
	2 bifacial
	3 edge margins
	4 other, specify

Dimensions of interior grinding surfaces on metates (cm)

Column	Variable
58	Wear
	1 ground
	2 battered
	3 polished
	4 crushed
	5 striations
	6 1 + 2 above
	7 1 + 5 above
	8 other, specify
	9 indeterminate
60-62	Length
64-66	Width
68-70	Depth
75-80	Comments

Figure A4.1: Chipped and Groundstone Coding Format (Continued)

LITHICS NARRATIVE

Sample Unit #_______________ Date_______________ Recorder______________________

Site #________ # Items Present: 1-9_____ 10-25_____ 26-100_____ 101-500_____

501+_____ Sample or Prov. #__________

Sample: Sample Type: none______ all observed______ quadrat______ tools only______
tools outside sample area_____ midden/trash_____ other, specify____________
Dimensions__________ x ___________ m
Sample location and depositional context______________________________________

____

____

Lithic Distribution: Summarize entire distribution, describe and locate concentrations note variability observed in distribution of chipped and ground stone, note spatial relationships to architecture and/or topography. Note tool distribution, reduction stage distributions.

____

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Draw projectile points and other tools of interest to scale below:

Figure A4.2: Lithics Narrative Form

(% or count)
ASSEMBLAGE SUMMARY

	edge modification	glassy volcanics	crys. volcanics	sediments	quartzite	chert	chalcedony	petrified wood	rhyolite	chal. pet. wood	other	TOTAL
Angular Debris												
Flakes Primary												
Secondary												
Tertiary												
BFT												
Pressure												
Bipolar												
Cores Blade												
Multiplat.												
Bipolar												
Tools Uniface												
Biface 1												
Biface 2												
Biface 3												
Proj. Pt.												

(% or count)

Ground Stone: Type	Frequency	Material	Total

Comments: Include especially breakage estimates for chipped and ground stone assemblages (i.e. percentage whole, more than 50% present, less than 50% present), also observations about assemblage composition and general reduction technique.

Figure A4.2: Lithics Narrative Form (Continued)

Field Form Attribute Definitions

A glossary of attributes found on the field forms follows. The code sheet is described first (Figure A4.1), and attributes are defined in the order that they appear on the sheet.

All Items

Provenience data, material type, and completeness attributes are recorded for all chipped stone and groundstone items.

➡Site Number:

The temporary field number assigned to the site.

➡Provenience Number:

Intrasite provenience labels assigned by the crew during recording. Provenience numbers are usually assigned to different architectural components, but may also refer to hearths, middens, drainage unit or artifact concentrations.

➡Sample Number:

Intra-provenience labels assigned to samples. Example: A roomblock and associated midden are assigned a provenience number. If sampled separately, each would receive a sample number.

➡Material Type:

The first six material type codes are generic. The last seven codes are the most frequently employed on this project, along with "03," crystalline volcanics, which includes a wide range of basalts.

Chalcedonic petrified wood appears to be the heartwood of the petrified logs that occur locally. Nevertheless, it is differentiated from the lower quality log exteriors because of its superior flaking qualities and distinctive appearance.

Exotic materials not coded on the form are tallied and described on the lithics narrative form.

Completeness is coded for all items and refers to the portion of the item that is present. "Not applicable" is coded for items which are by definition impossible to judge as complete or incomplete, such as angular debris.

The recorder codes the form to this point for both chipped and groundstone, then makes a decision to go to the chipped stone section or to the groundstone section, or both, if the item is a composite chipped/groundstone artifact.

Chipped Stone

➡Measurements:

Whole and proximal end fragments of flakes are measured in millimeters, with length to the nearest 5 mm and thickness to the nearest millimeter. Measurements are also taken on formal tools. Length, width, and thickness measurements to the nearest millimeter are taken on projectile points.

➡Type:

"Typing" an item combines a variety of attribute decisions. As a result, types are higher order variables than attributes and can be expected to be less precise. The type list is designed to monitor only morphology of items not function. Many definitions are adapted from Camilli (1981, 1983), Camilli and Nelson (1983), and Chapman and Schutt (1977).

Core: Camilli's (1981:55) definition is "pieces of material which exhibit no bulb of percussion and (which have) two or more negative scars at least two centimeters long which originates from one or more surfaces." On this project, an item must have at least three negative scars to be considered a core.

Bipolar Core — A core with platform remnants on opposing ends and with opposing negative scars and/or bulbs of percussion, resulting from force rebounding from two directions (see "bipolar flake" for more discussion).

Single Platform Core — A core with flakes removed from only one platform plane.

Multi-platform Core — A core with flakes removed from numerous platform planes.

Blade Core — A core with blades (flakes more than twice as long as they are wide) removed from one platform plane.

Angular Debris: "Debitage on which no ventral surface can be defined but which does exhibit unquestionable negative scars characteristic of the percussion technique" (Camilli 1981:54).

Flake: A lithic artifact which exhibits a dorsal and ventral side. Whole flakes exhibit a recognizable bulb of force and a platform. Debitage refers to flakes and angular debris and is a comprehensive term for the products of core reduction.

Biface Thinning Flake: A long, thin, curved flake with numerous dorsal scars, ventral lipping, a multifaceted platform resulting from removal from a worked edge, and no cortex.

This is an "ideal type" definition for biface thinning flakes, which encompass a wider range of variability than the definition suggests.

Bipolar Flake: "Bipolar debris is defined by the presence of two positive bulbs of percussion on the same or different surfaces, or the existence of one positive bulb of percussion at one end of the artifact and a negative scar originating from the opposite end of the same or a different surface. Crushing at opposite ends of the item is often evident.

Flakes also often exhibit a conical bulb of percussion" (Camilli and Nelson 1983:4). Bipolar flakes are characterized by "orange slice" morphology; i.e., a lateral strip of cortex separates opposing platforms. Bipolar flakes may be differentiated from bipolar cores by this trait.

Pressure Flake: A flake resulting from final biface thinning, similar to a biface thinning flake but less than 1.0 cm in length and 0.1 cm in thickness and with a decreased number of dorsal scars due to small size.

Tested Cobble: Camilli's (1981:55) definition is "cobbles from which a single flake has been removed as if the material had been tested for suitability as a tool medium, and cobbles which appeared to have been intentionally broken in half."

On this project, cobbles from which two flakes have been removed were also considered to be tested cobbles.

Chunk: A surficially unmodified cobble or piece of lithic material.

Uniface: "Any artifact that has flake scars which extend over one-third or more of only one surface of the artifact" (Camilli 1981:55).

Biface: Any artifact "which has flake scars extending over one-third or more of both the dorsal and ventral faces of the artifact" (Camilli 1981:55).

Bifaces undergo various changes in morphology from the bifacial core or roughout stage through the perform stage to the finished tool stage (Thomas and Bierwirth 1983). These were recorded as Bifaces 1, 2, and 3 following Callahan (1979).

> Biface 1 — A biface which exhibits primary thinning - a bifacially worked edge, irregular outline, widely and variably spaced flake scars (Nelson 1983:4).
>
> Biface 2 — A biface which exhibits secondary thinning - a bifacially worked, semi-regular outline, and closely and/or semi-regularly spaced flake scars (Camilli and Nelson 1983:4).
>
> Biface 3 — A shaped piece which is bifacially worked with a regular outline and closely and/or quite regularly spaced flake scars (Nelson 1983:4).

➡Dorsal Cortex:

The presence of dorsal cortex was indicated as either covering greater or less than half of the dorsal face of the flake. Absence of dorsal cortex was also monitored, as was presence of total dorsal cortex.

➡Dorsal Scar Count:

The number of negative flake scars on the dorsal face of a flake, counted from zero to nine with more than nine scars recorded as nine. Some researchers, e.g. Nelson (1983), require that dorsal scars more than 4 mm in length be recorded, but this stipulation was not made during the San Augustine Project.

➡ **Platform Characteristics:**

The platform is the remnant of the original striking platform of the core from which the debitage was detached.

Platform types include single-faceted (characterized by a smooth, single-plane noncortical surface), multifacet (characterized by a multiplaned noncortical surface), and cortical (cortex is present on the platform).

Multifaceted platforms usually have acute platform angles because the platform represents a worked edge that is being thinned or resharpened.

Crushing and grinding of the platform surface were also monitored and may indicate preparation of a better striking surface.

All the chipped stone categories reviewed above are completed only for whole flakes, flakes with the proximal (platform) end present, and formal tools.

Only "type" and "cortical covering" variables are recorded for cores, angular debris, tested cobbles, and chunks.

Chipped Stone Tools

The following section is recorded for formal and informal tools alike.

➡ **Breakage:**

The tool portion present. This list of attributes or characteristics is specific to projectile points and is less useful for bifaces, unifaces, or informal or composite tools.

Two columns provide room to code combinations of attribute states, for example, a reworked base.

➡ **Edge modification:**

Use, sharpening, or manufacture of a tool edge, as opposed to the tool surface. The next five attributes are coded for each modified edge of a tool, regardless of the absence or amount of surface modification.

➡ **Utilization:**

Systematic edge scarring extending up to 2 mm from the tool edge.

➡ **Marginal retouch:**

Systematic edge scarring extending 2 mm or more from the tool edge but covering less than one-third of the dorsal or ventral artifact surface.

Edges may be bifacially or unifacially modified by marginal retouch or utilization. They may also be ground or battered, in which case the modification takes place on the edge itself rather than on one or both faces. Types of edge modification are quantitatively defined in terms of number of millimeters from the tool edge so as to avoid decisions about wear patterns, which are problematical even under magnification (Rowan and Thomas n.d.) and very difficult to observe in the field.

➡ **Location of modification:**

Location of utilization or retouch scars distinguishes between utilization and retouch on lateral flake margins versus proximal and distal (the platform end and its opposite) margins. Location may be possible to define even when proximal and distal ends are difficult to distinguish, as on biface fragments.

➡ **Edge shape:**

Edge shape refers to the morphology of the modified edge, and to the presence of projections or other retouched alterations of the flake margin. A point is an acute modification greater than 4 mm in length. A spur is an acute modification less than 4 mm in length. A notch is a concavity greater than 4 mm wide. Denticulations are teeth or serrations on an edge.

➡ **Original edge angle:**

The cross section of the edge prior to retouch or utilization and is recorded as less than or greater than 45 degrees.

➡ **Modified edge angle:**

The cross section of the edge after retouch or utilization and is also recorded as less than or greater than 45 degrees.

The remaining two chipped stone tool categories are completed for all tools that are surficially shaped and all tools with edge modification. A distinction is made between edge modification and surface modification.

In both cases, for flake tools, "post detachment" refers to edge and surface modification initiated after the flake left the core and does not include pre-detachment dorsal scars.

➡Percent of Post-detachment Edge Modification:

The percentage of total linear edge modification on a tool compared to the total quantity of edge line. Post-modification breaks are not included in estimation of total quantity of edge line.

➡Percent of Post-detachment Surface Modification:

The percentage of the total area of modified surface on a tool compared to the total area of surface. Post-modification breaks are not included in the estimation of total surface area.

Groundstone

Groundstone includes a wide range of implements whose morphology is related to grinding and battering.

➡Type:

Metate: "Oval or rectangular sandstone slabs which are sometimes intentionally shaped by flaking, grinding, or pecking the slab edges" (Camilli 1983:191).

Milling surfaces may vary from flat to deeply concave. Metates are classified by the shape of the milling surface: slab, basin, or trough. Bedrock metates are ground concave surfaces in bedrock outcrops and are consequently immobile tools.

Mano: An artifact "which has at least one surface characterized by one or more smooth facets produced through grinding. Mano form varies from oval to rectangular and is produced either through intentional shaping by grinding and pecking of the natural surface or from the use of an unmodified cobble" (Camilli 1983:191).

Whole handstones are 15 cm or less in length; two-hand manos are longer than 15cm in length.

Mortar: A steep-sided circular milling basin designed as a vessel for mashing, pounding, or grinding.

Pestle: A cylindrical milling stone over twice as long as its diameter, with grinding or battering scars on one or both ends produced by grinding or pounding in a mortar.

Worked slab: A thin, flat block of material intentionally shaped but with no apparent milling surface.

Abrader: An object generally made of an abrasive material like sandstone, with a grooved surface for dulling edges of chipped stone tools, presumably to facilitate hafting.

Polishing stone: A smooth-surfaced cobble or pebble less than 10 cm in length.

Hammerstone: Artifacts which exhibit battering with accompanying scars on edge margins (the intersection of two plane surfaces) or on convex surfaces. The artifact may or may not be prepared by unifacial or bifacial reduction. No "chopper" classification was employed during this project, so the distinction Chapman (1977:913) and Camilli (1981:55) make between choppers and hammerstones based on bifacial flaking of an edge for use in chopping or on location of battering (edges vs. surface) must be made here by looking at the chipped stone attributes described above and at the "preparation" attribute described below.

Hammerstones are often composite tools that have been employed as hammers after other uses. Examples are core/hammerstones and mano/hammerstones. Classification is by shape.

Anvil: An item greater than 15cm in length with a flat, convex, or concave surface and with battering scars or deep (greater than 4mm) pecking scars on the surface. This wear is a result of use of the surface to stabilize an object being struck by a hammer, as in bipolar reduction or in the processing of nuts.

Other groundstone: Items that do not fit into any of the above categories. These items are described by the coder in the margins of the form.

Indeterminate groundstone: Ground or battered items that cannot be classified into the

above categories, usually because they are so fragmentary that their original morphology is indistinct.

➡ **Preparation:**

Morphological or surface modification of groundstone objects during their manufacture or use to shape them. It includes pecking or flaking to sharpen milling or battering surfaces and edges.

➡ **Worn Surfaces:**

Location of wear.

➡ **Cross section of utilized face:**

This attribute refers to items with ground or battered surfaces rather than edge margins. The form provides room for two entries, i.e., two surfaces per item.

➡ **Wear:**

Modification of groundstone objects as a result of their use. One object may exhibit several kinds of wear. A "ground" surface is one that has been smoothed through coarse abrasion, resulting in an even but dull texture. A "battered" surface or edge is one with coarse scarring and distinct spalls and crushing from hammering, or pounding. A "polished" surface is one that has been smoothed through fine abrasion resulting in a lustrous gloss. A "crushed" surface or edge is one with fine scarring and indistinct spalls and fractures from hammering, pounding, or abrasion, usually on an edge.

Differences in wear between battering and crushing may be due to groundstone material properties (striking force, angle, motion, and duration of use) or properties of materials that are being manufactured or processed. Striations are fine parallel lines on the worn surface, usually resulting from a reciprocal grinding motion.

➡ **Dimensions of interior grinding surface of metates:**

Measurements are taken only for whole metates on interior surfaces exhibiting wear.

Additional Definitions

The following additional definitions are for terms that appear on the tally sheet but not on the code sheet.

➡ **Debitage:**

Primary flakes have over 50 percent cortex on the dorsal surface. Secondary flakes have less than 50 percent cortex on the dorsal surface, but some cortex is present. Tertiary flakes are noncortical flakes. Size of flake was not a criterion for distinguishing reduction stage.

➡ **Projectile Point:**

"A symmetrical, bifacially flaked implement with a pointed distal margin and basal modification which enables hafting" (Camilli 1983:188).

Intrasite Sampling Strategies

The procedure for recording lithics on a site is as follows: Once a site is located, crew members pinflag lithics while forming a general impression of site type and lithic density and distribution. The sampling strategy is based on this general impression. Time constraints, a basis for the choice of sampling strategy, are conditioned by (1) the number of items on the site; (2) the distribution of items, i.e., the feasibility of intrasite sampling and ease with which a sampling unit is perceived; and (3) the site type, which determines how much time other crew members will be spending on the site.

The preferred option is always an "all-observed" inventory using the code sheet. This has been feasible only on small lithic sites, ceramic and lithic sites, and architectural sites with few lithics. When sampling is necessary, the lithic recorder decides what area to sample, based on culturally relevant criteria such as architectural units or features. The decision is not based on density of lithics, i.e., dense areas are not necessarily preferred sample areas. Sampling options include the following:

1. No items are coded, and the assemblage is described on the narrative form. This option has been chosen for very large, amorphous assemblages where use of the tally sheet is not feasible. In this case, only the first page of the narrative/tally sheet (Figure A4.2) is completed.

2. Both sides of the narrative/tally form are completed in instances where the assemblage numbers approximately 30 to 150 items.

3. A sample of items is recorded on the code sheet and the front narrative page (Figure A4.2) is completed. The sample may or may not reflect the rest of the assemblage, but the narrative data applies to the entire assemblage. Samples may be tallied, rather than coded.

At the day's end the lithic data for sites is coded on a lithic narrative summary sheet which abstracts sample type and assemblage information (Figure A4.3) for each site.

Training and Coding Error

Inconsistencies in the recording of attributes may account for a large part of the variability in lithic assemblages (Fish 1978; Larralde 1984) and may obscure cultural patterning. The number of coders, the intensity of coder training, and the use of well-defined, mutually exclusive attribute codes are the three most important factors that influence coder inconsistency.

Two kinds of efforts to reduce inconsistency and nonrandom bias in the lithic data base were emphasized. First, the extensively lab and field tested attribute codes described above were used on this project. Secondly, lithics coders were trained and scheduled as follows: Signa Larralde coordinated lithics sampling and coding; Jim Brandi expressed an interest in lithics and the two scribed together for three initial days of training comparing attribute calls on some 200 artifacts and using the code form. During this period, site sampling strategies and problems were discussed in detail.

This discussion continued throughout the five field sessions. The result was that after the training period, each crew was staffed with a trained lithics coder (Larralde or Brandi). This was the preferred and usual crew roster, although three other crew members occasionally coded lithics. These coders were trained in the same way but not as intensively.

A consistency test in which Larralde, Brandi, and Donaldson coded the same 25 artifacts was conducted midway through the third field session. Results of the test pointed out areas of misunderstanding in coding. One known area of confusion was material types. Material samples were collected and compared with the UNM Office of Contract Archeology type collections so that inaccuracies in material type identification could be reduced.

Figure A4.3: Lithic Sample and Narrative Coding Format

```
Col.    Topic

1-4     Site #
5-6     Provenience
  7     Sample #
  8     Sample type:  0 -  None
                      1 -  All observed
                      2 -  Quadrat
                      3 -  Tools only
                      4 - Tools outside sample area
                      5 - Midden/trash area
                      8 - Other, specify
                      9 - Unknown
10-13   Sample area in square meters
15-17   # Items coded (999-unknown)
   19   # Items present (estimate or count): 1 - 1-9
                                             2 - 10-25
                                             3 - 26-100
                                             4 - 101-500
                                             5 - 501+
                                             9 - unknown

Code remainder ONLY 1) if data from entire site differs from sample or
                    2) if site was not sampled and only narrative form was completed.

22-32   Chipped stone material types -- room for 4 entries of 2 cols. each
           1st col.: 1 - rare (less than 10%)
                     2 - common (11-30%)
                     3 - dominant (50+%)
           2nd col.: material types - 02 - glassy volcanics
                                      03 - crystalline volcanics
                                      05 - other sediments
                                      10 - quartzite
                                      20 - chert
                                      21 - chalcedony
                                      22 - petrified wood
                                      23 - rhyolite
                                      24 - chalcedonic petrified wood
                                      08 - other
35-40 Reduction Sequence
      Code for each column: 0 - absent         Col. 35 - primary
                            1 - rare                36 - secondary
                            2 - common              37 - tertiary
                            3 - dominant            38 - biface thinning
                                                    39 - pressure
                                                    40 - bipolar
44-46  Cores.  Code # observed as 0 to 9, 9+=9
           Col. 44 - blade
                45 - multiplatform
                46 - bipolar

Col.    Topic

48-55   Chipped stone tool types -- room for 4 entries of 2 cols. each
           1st col.:  Code # observed as 0-9, 9+=9
           2nd col.:  1 - utilized or retouched non-formal tool
                      2 - uniface
                      3 - biface 1
                      4 - biface 2
                      5 - biface 3
                      6 - projectile point
                      8 - other

57-60   Formal tool breakage.  Code for each column % assemblage in that category:
           Col. 57 - whole                         0 - 0%
                58 - more than 50% present         1 - 1-25%
                59 - less than 50% present         2 - 26-50%
                60 - indeterminate                 3 - 51-75%
                                                   4 - 76-100%

64-71   Ground stone type - room for 4 entries of 2 cols. each
           1st col. - code # observed as 0-9, 9+=9
           2nd col. -    1 - metate
                         2 - one hand mano
                         3 - 2 hand mano
                         4 - hammerstone
                         8 - other
                         9 - indeterminate

73-76   Ground stone breakage
           Code for each col. % assemblage in that category:
              Col. 73 - whole                      0 - 0%
                   74 - more than 50% present      1 - 1-25%
                   75 - less than 50% present      2 - 26-50%
                   76 - indeterminate              3 - 51-75%
                                                   4 - 76-100%
```

Appendix 5

Summary of Lithic Data

by Provenience Type

Table A5.1 Distribution of Non-local Lithics

Site	Sample	Prov.	Brown-Spotted Chert No.	Brown-Spotted Chert Form	Zuni Wood No.	Zuni Wood Form	Other No.	Other Form
226	1	1	1	uniface				
228	1	1	4	flakes				
			1	heat spall				
229	2	1	2	flakes				
232	1	1	1	flake				
233	1	1	1	uniface				
235	1	1	1	flake				
248	1	C	1	single platform core				
249	1	1			1	angular debris		
254	1	1			1	biface thinning flake		
262	1	1	2	unrecorded				
263	1	T	2	unrecorded				
263	3	T	3	unrecorded				
273	4	1	1	unrecorded				
291	1	1					1	Washington Pass chert projectile pt.
327	1	1	1	chunk				
327	2	T	2	unrecorded	1	unrecorded		
330	2	A	4	unrecorded				
331	1	1	2	unrecorded				
333	26	1			5	flakes		
					1	modified flake		
452	4	1			3	unrecorded		
452	5	1			1	unrecorded		
452	6	1			1	unrecorded		
453	1	1	1	angular debris				
467	1	1	1	modified flake				
472	3	T	1	heat spall				
472	3	R			1	flake	1	turquoise chunk, unworked
489	1	1			1	flake		
490	1	1			1	flake	1	malachite chunk, unworked
					1	angular debris		
491	1	1			3	flakes		
					1	modified flake		
493	1	1	1	flake				
495	2	1			1	flake		
Totals No. Items:			33 items		23 items		3 items	
Totals No. Provs.:			19 proveniences		12 proveniences		3 proveniences	

Table A5.2: Proveniences in Each Provenience Type (Site/Sample/Provenience)

Non-Structural Samples

Small Proveniences* (n=20)			**Large Scatters** (n=20)			**Large Scatters with Features** (n=17)		
Site	Sample	Prov.	Site	Sample	Prov.	Site	Sample	Prov.
2	1	1	1	1	1	230	1	1
229	2	1	3	1	1	237	1	1
236	1	1	225	1	1	238	1	1
240	1	1	232	1	1	243	1	1
246	2	1	241	1	1	245	1	1
268	1	1	250	1	1	246	1	1
268	4	1	260	1	1	252	1	1

Table A5.2: Proveniences in Each Provenience Type (Continued)

Non-Structural Samples

Small Proveniences* (n=20)

Site	Sample	Prov.
268	5	1
268	9	1
451	1	1
459	1	1
486	3	1
486	4	1
486	5	1
486	7	1
486	8	1
495	1	1
492	2	1
495	3	1
495	4	1

Large Scatters (n=20)

Site	Sample	Prov.
277	1	1
313	1	1
319	1	1
325	1	1
455	1	1
461	1	1
474	1	1
475	1	1
487	1	1
488	1	1
489	1	1
493	1	1
494	1	1

Large Scatters with Features (n=17)

Site	Sample	Prov.
254	1	1
267	1	1
272	1	1
293	1	1
294	1	1
449	1	1
457	1	1
477	1	1
478	1	1
491	1	1

Scatters (n=12)

Site	Sample	Prov.
240	2	1
240	3	1
242	1	1
244	1	1
249	1	1
261	1	1
292	1	1
293	2	1
452	1	1
496	1	1
498	2	1
499	1	1

Scatters with Features (n=9)

Site	Sample	Prov.
257	1	1
269	1	1
295	1	1
312	1	1
333	25	1
333	26	1
470	1	1
488	2	1
492	1	1

*Provenience 9/1/1 is omitted from analysis because the area is unknown.

Structural Samples

Roomblocks (n=6)

Site	Sample	Prov.
248	1	A
253	1	B
270	9	A
291	1	A
472	2	Roomblock
472	3	Roomblock

Middens (n=5)

Site	Sample	Prov.
235	1	1
253	1	A
253	1	C
290	1	1
472	3	Trash

Pitstructures (n=4)

Site	Sample	Prov.
270	9	C
270	12	A
270	12	B
316	1	1

Small Structures (n=16)

Site	Sample	Prov.
233	1	1
239	1	1
247	1	1
251	1	1
255	1	1
270	5	A
270	9	B
296	1	1
318	1	1
321	1	1
327	2	A
333	1	1
476	1	1
479	1	1
480	1	1
490	1	1

Table A5.3: Flake Length (mm) Per Provenience Type

Prov. Type	X Whole Flakes	X Proximal Frags.	Overall X	Maximum X	Minimum X	Range of Means
Small Prov.	38.4	25.1	31.3	85.0	15.0	60.0
Small Struct.	39.7	30.2	35.0	55.6	20.0	35.6
Roomblocks	35.6	30.6	33.1	41.3	26.7	14.6
Middens	31.1	30.3	30.7	40.5	25.0	15.5
Pitstructures	41.6	37.5	39.6	57.5	25.0	32.5
Scatters	35.7	36.5	37.8	72.0	10.0	62.0
Scatters w/Fea.	29.7	27.5	28.5	45.0	11.7	33.3
Large Scatters	31.2	25.7	28.4	46.3	14.3	32.0
Lge Scat.w/Fea.	35.0	27.2	31.1	47.8	12.8	35.0
Isolated Occur.	38.3	28.2	33.3	95.0	10.0	85.0

Table A5.4: Flake Thickness (mm) Per Provenience Type

Prov. Type	X Whole Flakes	X Proximal Frags.	Overall X	Maximum X	Minimum X	Range of Means
Small Prov.	7.8	5.8	6.8	13.0	2.0	11.0
Small Struct.	10.3	6.9	8.6	17.0	3.0	14.0
Roomblocks	7.4	7.0	7.2	10.8	4.6	6.2
Middens	7.5	7.2	7.4	9.7	4.8	4.9
Pitstructures	11.1	10.4	10.8	19.0	7.6	11.4
Scatters	11.0	9.8	10.4	35.0	2.0	33.0
Scatters w/Fea.	5.6	6.1	5.9	10.0	2.7	7.3
Large Scatters	8.0	6.6	7.3	14.0	2.3	11.7
Lge Scat.w/Fea.	10.0	7.7	8.9	24.0	2.2	21.8
Isolated Occur.	11.7	7.8	9.8	35.0	1.0	35.0

Table A5.5: Flake Length to Thickness Ratio Per Provenience Type

Prov.- Type	X Whole Flakes	X Proximal Frags.	Overall X	Maximum X	Minimum X	Range of Means
Small Prov.	5.48	5.49	5.49	2.14	3.18	5.26
Small Struct.	4.72	5.16	4.94	8.75	2.06	6.67
Roomblocks	6.99	5.29	6.14	10.00	3.33	6.67
Middens	4.75	5.37	5.06	6.29	4.10	2.19
Pitstructures	4.25	3.74	4.00	4.79	3.29	1.50
Scatters	5.24	3.59	4.73	9.00	0.77	8.23
Scatters w/Fea.	5.61	4.85	5.23	6.96	3.75	3.21
Large Scatters	4.96	4.91	4.94	8.75	2.86	5.89
Lge Scat.w/Fea.	5.15	4.65	4.90	7.22	2.22	5.00
Isolated Occur.	5.43	5.18	5.31	15.00	1.70	13.30

Table A5.6: Cortex on Whole Flakes by Provenience Type

Provenience Type	100% No.	100% Percent	50-99% No.	50-99% Percent	1-49% No.	1-49% Percent	0% No.	0% Percent	Total Number
Small Proveniences	7	7.7	17	18.7	21	25.1	45	49.5	91
Small Structures	12	12.4	21	21.7	31	32.0	33	34.0	97
Roomblocks	5	11.9	4	9.5	17	40.5	16	38.1	42
Middens	3	8.3	3	8.3	6	16.7	24	66.7	36
Pitstructures	3	10.0	2	6.7	12	40.0	13	43.3	30
Scatters	5	10.9	12	26.1	13	28.3	15	32.6	46
Scatters w/Features	2	1.6	8	6.4	26	20.8	89	71.2	125
Large Scatters	3	2.9	12	11.4	29	27.6	61	52.1	105
Large Scatters w/Features	9	5.6	21	13.1	51	31.9	79	49.4	160

Table A5.7: Dorsal Scars on Whole Flakes by Provenience Type

Provenience Type	0-1 Scars No.	0-1 Scars Percent	2-3 Scars No.	2-3 Scars Percent	4-5 Scars No.	4-5 Scars Percent	6+ Scars No.	6+ Scars Percent	Total No.
Small Proveniences	28	30.4	33	35.9	20	21.7	11	12.0	92
Small Structures	31	31.6	36	36.7	22	22.5	9	9.2	98
Roomblocks	6	14.3	17	40.5	11	26.2	8	19.0	42
Middens	6	16.6	7	19.4	15	41.7	8	22.3	36
Pitstructures	5	16.6	15	50.0	8	26.7	2	6.6	30
Scatters	22	47.8	12	26.1	8	17.4	4	8.7	46
Scatters w/Features	22	17.6	57	45.6	28	22.4	18	14.4	125
Large Scatters	18	17.1	31	29.5	41	39.1	15	14.3	105
Large Scatters w/Features	41	25.5	66	41.0	34	21.1	20	12.3	161

Table A5.8: Cortex by Material Type for All Whole Flakes

	Percent Cortex							
	0%		1-49%		50-99%		100%	
Material Type	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Silicified Wood	207	62.4	78	23.5	30	9.0	17	5.1
Quartzite	28	21.5	49	37.7	36	27.7	17	13.1
Chert/Chalcedony	116	56.3	44	21.4	30	14.6	16	7.8
Crystalline Volcanic	81	48.2	51	30.4	21	12.5	15	8.9

Table A5.9: Dorsal Scar Count by Material Type for All Whole Flakes

	Dorsal Scar Frequency							
	0-1		2-3		4-5		6+	
Material Type	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Silicified Wood	56	16.9	118	35.5	100	30.1	58	17.5
Quartzite	51	39.2	53	40.8	19	14.6	7	5.4
Chert/Chalcedony	47	22.8	83	40.3	51	24.8	25	12.1
Crystalline Volcanic	47	28.0	64	38.1	41	24.4	16	9.5

Table A5.10: Frequency of Material Types for Sites Grouped by Provenience Type

Provenience Type	Silicified Wood #	Silicified Wood %	Quartzite #	Quartzite %	Chert/ Chalcedony #	Chert/ Chalcedony %	Misc Volcanic #	Misc Volcanic %	Other #	Other %	Other Fine-grained #	Other Fine-grained %	Total Flakes
Small Proveniences	88	40.7	40	18.5	58	26.7	26	12.0	3	1.4	1	.5	256
Small Structures	104	38.3	62	22.7	44	16.1	34	19.3	3	1.1	6	2.2	273
Roomblocks	32	29.6	12	11.1	27	25.0	32	29.6	2	1.9	3	2.8	108
Middens	44	36.1	12	9.8	27	22.1	33	27.1	3	2.5	3	2.5	122
Pitstructures	31	40.3	9	11.7	13	16.9	19	24.7	0	0.0	5	6.5	77
Scatters	32	28.1	30	26.3	27	23.7	23	20.2	1	.9	1	.9	114
Scatters w/Features	204	64.0	16	5.0	62	19.4	30	9.4	1	.3	6	1.9	319
Large Scatters	145	48.5	26	8.7	74	24.8	49	16.4	4	1.3	1	.3	299
Large Scatters w/Features	141	35.3	56	14.0	128	32.0	58	14.5	10	2.5	7	1.8	400
Isolated Occurrences	31	37.4	12	14.5	29	34.9	11	13.3	0	0.0	0	0.0	83

Table A5.11: Presence/Absence of Tool Type by Provience Type

Provenience Type	N	Informal Tools #	Informal Tools %	Unifaces #	Unifaces %	Bifaces #	Bifaces %	Projectile Points #	Projectile Points %	Cores #	Cores %	Hammer - stones #	Hammer - stones %	Manos #	Manos %	Metates #	Metates %
Small Scatters	20	2	10.0	1	5.0	5	25.0	5	25.0	10	50.0	4	20.0	4	20.0	1	5.0
Small Structures	16	9	56.3	4	25.0	7	43.8	3	18.8	9	56.3	11	68.8	8	50.0	4	25.0
Roomblocks	6	1	16.7	0	16.7	3	50.0	1	16.7	4	66.7	1	16.7	1	16.7	1	16.7
Middens	5	5	100.0	2	40.0	3	60.0	0	0.0	5	100.0	3	60.0	3	60.0	1	20.0
Scatters	12	6	50.0	0	0.0	5	41.7	1	8.3	7	58.3	3	25.0	4	33.3	0	0.0
Scatters w/Features	9	4	44.4	0	0.0	2	22.2	2	22.2	4	44.3	4	44.4	2	22.2	0	0.0
Large Scatters	20	5	25.0	1	5.0	5	25.0	4	20.0	8	40.0	3	15.0	4	20.0	1	5.0
Large Scatters w/Features	17	12	70.6	2	11.8	6	35.3	1	5.9	8	47.1	9	52.9	8	47.1	2	11.8
Pit Structures	4	0	0.0	1	25.0	1	25.0	2	50.0	1	25.0	3	75.0	2	50.0	0	0.0

= Number of proviences at which tool type is present.

Table A5.12: Tool Frequencies Per Provenience Type

Provenience Type	Inf. Tools		Formal Tools				Hammerstones		Cores		Groundstone			Assemblage Total	Tool Total
	#	%	Uniface	Biface	Proj Pt	Formal Tool %	#	%	#	%	Manos	Metates	Groundstone %		
Small Proveniences	2	1.1*	1	7	7	8.6	4	2.3	20	11.5	6	1	4.0	174	39
Small Structures	17	5.5	5		5	6.1	19	6.1	19	6.1	18	5	7.4	310	97
Roomblocks	3	3.2	2	4	4	10.8	1	1.1	8	8.6	1	1	2.2	93	24
Middens	5	3.9	5	5	0	7.7	3	2.3	11	8.5	6	2	6.2	130	37
Pitstructures	0	.0	1	1	7	10.5	5	5.8	1	1.2	4	0	4.7	86	19
Large Scatters	9	3.0	2	10	7	6.3	9	3.0	14	4.7	7	3	3.3	300	61
Large Scatters w/Features	42	9.7	1	14	4	4.4	16	3.7	21	4.8	20	2	5.1	434	120
Scatters	6	5.4	0	6	0	5.4	1	.9	8	7.1	11	0	9.8	112	30
Scatters w/Features	19	5.8	0	1	3	1.2	8	2.4	7	2.1	3	0	1.2	330	41
Isolated Occurrences	0	.0	0	8	1	9.7	2	2.2	7	7.5	5	1	6.5	93	24

*Proportion of Assemblage Total

Table A5.13: Diversity Indexes Per Provenience Type						
Provenience	**Mean**		**Low**		**High**	
Type	**SW***	**Var****	**SW**	**Var**	**SW**	**Var**
Small Proveniences	.215	.205	.000	.091	.602	.364
Small Structures	.543	.364	.301	.182	.759	.545
Roomblocks	.369	.258	.000	.091	.687	.455
Middens	.617	.419	.577	.364	.678	.455
Pitstructures	.372	.228	.301	.182	.452	.273
Scatters	.292	.215	.000	.091	.673	.455
Scatters w/Features	.166	.195	.000	.091	.545	.364
Large Scatters	.219	.205	.000	.091	.649	.455
Large Scatters w/Feats.	.387	.422	.000	.091	.783	.636

*Shannon-Weaver Index
**Variety Index

Table A5.14: Lithic Artifact Density by Provenience Type				
Provenience Type	**Overall Mean**	**Low Mean**	**High Mean**	**Range**
Small Proveniences	.55	.03	1.44	1.41
Small Structures	.06	.01	.37	.36
Roomblocks	.11	.02	.36	.34
Middens	.10	.01	.33	.32
Pitstructures	.63	.02	2.13	2.11
Scatters	.04	.01	.09	.08
Scatters w/Features	.12	.01	.44	.43
Large Scatters	.01	.00	.04	.04
Large Scatters w/Features	.01	.00	.05	.05

Table A5.15: Distribution of Whole vs. Indeterminate Fragments of Formal Tools

Provenience	Uniface		BF1		BF2		BF3		Undiff		Total	
Type	W	I	W	I	W	I	W	I	W	I	W	I
Small Proveniences	0	1	4	2	1	0	2	1	0	0	7	4
Small Structures	1	4	3	3	1	0	3	0	1	0	9	7
Roomblocks	2	0	3	0	0	1	0	0	0	0	5	1
Middens	4	1	3	0	1	0	0	0	0	0	7	1
Pitstructures	1	0	0	0	0	0	6	0	0	0	7	0
Scatters	0	0	3	0	2	0	1	0	0	0	6	0
Scatters w/Features	3	0	1	1	0	0	0	0	0	0	4	1
Large Scatters	0	2	2	1	1	5	3	0	0	0	6	8
Large Scatters w/Features	4	0	5	0	4	1	1	0	0	0	14	1
Total	**15**	**8**	**24**	**7**	**10**	**7**	**16**	**1**	**1**	**0**	**71**	**23**

Table A5.16: Distribution of Other Breakage Types of Formal Tools by Provenience Type

Provenience Type	Whole/Tip Broken	Base	Whole/Base Broken	Tip/Mid-Section	Midsection	Tip
Small Proveniences	2 BF3					
Small Structures	1 BF3	1 BF3				
Roomblocks	1 BF2		4 BF3			
Middens	1 BF2					
Pitstructures	1 BF3					
Scatter w/Features	1 BF3					
Large Scatters	2 BF3			1 BF3	2 BF3	
Large Scatters		1 BF3			1 BF3	2 BF1
w/Features	3 BF3					
Total	**2 BF1** **2 BF2** **8 BF3**	**2 BF3**	**4 BF3**	**1 BF3**	**3 BF3**	**2 BF1**

Table A5.17: Diagnostic Projectile Point Data

Provenience		Material	L	W	Condition
Unnotched					
268	9 1	chert	25	18	whole
Lanceolate, concave base					
264	1 1	chert	31	17	tip missing
452	8 1	chert	32	16	tip missing, lateral edge broken
Stemmed					
234	2 1	chert	17	20	tip missing
241	1 1	chert	31	16	tip & one corner of base missing
326	3 T	chert	32	20	whole, reworked, ground stem
241	1 1	petrified wood	29	22	whole
246	2 1	basalt	38	26	tip missing
453	1 1	basalt	46	22	tip missing
458	1 1	petrified wood	39	17	whole
495	2 1	chert	32	19	tip missing
Large Corner Notched					
240	1 1	rhyolite	48	20	tip missing
253	1 1	chalcedonic petrified wood	42	22	base broken
291	1 1	chalcedonic petrified wood	42	23	whole
321	1 1	chert	42	25	tip missing
322	1 1	chalcedonic petrified wood	49	28	whole
458	1 1	chert	28	17	tip missing
458	1 1	chert	33	19	tip missing
Large Side Notched					
234	2 1	chert	29	25	tip missing, base broken
274	1 A	chert	34	18	tip missing
280		chert	32	16	whole
322	2 1	chalcedonic petrified wood	24	18	tip missing
452	5 1	chalcedonic petrified wood	38	20	whole
461	1 1	chert	36	19	whole
464	1 2	obsidian	32	21	whole
Small Corner Notched					
185	1 1	chalcedony	25	16	whole
266	1 1	chalcedony	21	15	tip and one tang missing
333	26 1	obsidian	19	14	base broken
490	1 1	obsidian	20	18	tip, part of base, tangs missing
Small Side Notched					
248	1 B	chalcedony	19	19	whole
270	9 C	chert	10	15	tip and tangs missing
270	12 A	obsidian	22	11	whole
270	12 B	chalcedony	21	12	whole
270	12 B	obsidian	25	10	whole
270	17 A	chalcedony	20	12	tip missing
270	17 A	chalcedony	25	12	whole
294	1 1	chert*	22	15	tip missing; *possibly Wash.Pass
322	2 1	petrified wood	29	16	whole
457	1 1	petrified wood	21	12	whole

Appendix 6

Lithic Data from All-Observed and Other Samples

Table A6.1: SACA All-Observed Lithic Attribute Samples: Tool Type Counts

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
1	1	1	4	900	0	0	0	0	0	0	0	0	2	0	0
2	1	1	6	25	1	0	1	0	0	0	0	0	1	0	0
3	1	1	6	2500	0	0	0	0	0	0	0	0	0	0	0
9	1	1	6	0	0	0	0	0	0	0	0	0	0	0	0
225	1	1	3	1220	0	0	0	0	0	0	0	0	0	0	0
229	2	1	36	35	0	0	0	0	0	0	0	1	1	0	1
230	1	1	1	1250	0	0	0	0	0	0	0	0	0	0	0
232	1	1	23	3600	1	2	0	0	0	0	0	0	0	0	4
233	1	1	37	100	0	0	0	0	2	1	0	0	1	1	2
235	1	1	39	1500	0	3	0	1	1	0	0	0	1	2	0
236	1	1	6	25	0	0	0	0	0	0	0	0	0	0	0
237	1	1	44	3400	2	1	1	13	0	2	0	0	0	0	0
238	1	1	16	1012	0	0	0	4	0	1	0	0	1	0	0
239	1	1	21	900	1	1	0	6	0	0	0	1	0	0	2
240	1	1	10	64	0	0	0	0	0	1	0	1	0	0	0
240	2	1	10	240	0	0	0	0	0	0	2	0	0	0	0
240	3	1	8	88	0	1	0	1	0	0	0	0	0	0	0
241	1	1	59	1575	0	1	0	3	0	0	0	3	1	0	0
242	1	1	6	325	0	0	0	1	0	0	0	0	1	0	0
243	1	1	21	8055	0	0	0	1	0	0	0	0	0	0	1
244	1	1	3	480	1	0	0	0	0	0	0	0	0	0	0
245	1	1	98	7280	1	1	0	7	1	1	0	0	5	0	1
246	1	1	10	11700	0	1	0	2	0	0	0	0	1	0	0
246	2	1	62	0	1	4	1	1	0	0	0	2	5	1	5
247	1	1	26	2610	0	1	0	1	1	2	0	0	1	0	1
248	1	A	33	250	2	2	0	0	2	2	0	0	1	0	0
249	1	1	15	200	0	0	1	1	0	1	0	0	0	0	0
250	1	1	27	1000	0	2	0	1	0	0	0	0	2	0	0
251	1	1	25	1000	0	2	0	3	0	0	0	0	3	0	0
252	1	1	33	3900	1	2	0	0	0	0	3	0	0	0	1
253	1	A	17	168	1	2	0	1	0	1	0	0	0	0	1
253	1	B	12	33	0	0	0	0	0	0	1	4	0	0	0
253	1	C	13	40	0	1	0	1	4	0	0	0	4	0	1
254	1	1	24	803	0	0	0	3	0	0	0	0	6	1	0
255	1	1	22	3600	1	2	0	1	0	0	0	0	1	0	3
257	1	1	1	150	0	0	0	0	0	0	0	0	0	0	0
260	1	1	7	1350	0	0	0	0	0	0	2	0	0	0	1
261	1	1	18	208	0	0	0	1	0	0	0	0	0	0	0
267	1	1	24	3200	0	2	0	1	0	4	0	0	2	0	2
268	1	1	18	21	0	2	0	0	1	1	0	0	0	0	1
268	4	1	11	9	0	1	0	0	0	2	0	0	0	0	1
268	5	1	7	9	0	1	0	0	0	0	0	0	1	1	1
268	9	1	12	36	0	0	0	0	0	0	0	2	0	0	0
269	1	1	4	100	0	0	0	0	0	0	0	0	0	0	0
270	5	A	36	1500	1	3	0	0	1	2	0	0	0	0	3
270	9	A	3	63	0	0	0	0	0	0	0	0	0	1	0
270	9	B	23	208	0	0	0	0	0	0	0	3	2	0	2
270	9	C	14	100	0	0	0	0	0	0	0	1	0	0	1
270	12	A	30	126	0	0	0	0	1	0	1	0	2	0	0

Table A6.1: SACA All-Observed Lithic Attribute Samples: Tool Type Counts (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
270	12	B	34	16	0	0	0	0	0	0	0	6	2	0	3
272	1	1	13	2500	0	0	0	0	0	0	0	0	0	0	0
277	1	1	36	2275	1	1	0	0	0	1	0	0	0	3	2
290	1	1	25	3600	0	2	0	1	0	1	0	0	0	0	1
291	1	A	7	154	0	1	0	0	0	1	0	0	0	0	0
292	1	1	10	225	0	0	0	0	0	1	0	0	0	0	0
293	1	1	7	903	0	0	0	0	0	0	0	0	0	0	0
293	2	1	3	266	0	1	0	0	0	0	0	0	0	0	0
294	1	1	58	4500	2	5	0	1	0	0	2	3	2	0	1
295	1	1	3	300	0	1	0	0	0	0	0	0	0	0	0
296	1	1	24	1050	1	1	0	3	1	0	0	0	0	0	1
312	1	1	30	600	0	3	0	1	0	1	0	0	0	0	3
313	1	1	15	1000	0	0	0	0	0	0	0	0	0	0	0
316	1	1	8	400	1	0	0	0	0	0	0	0	0	0	1
318	1	1	19	130	0	1	1	1	0	1	0	0	0	0	1
319	1	1	13	1050	0	0	0	0	2	0	0	0	0	0	0
321	1	1	20	1400	0	1	1	1	0	0	1	0	0	0	1
325	1	1	10	1050	0	1	0	0	0	0	0	0	0	0	0
327	2	A	11	428	0	0	0	0	0	0	0	0	0	0	0
333	1	1	10	225	0	0	0	2	0	0	0	0	5	2	0
333	25	1	126	320	0	0	0	6	0	0	0	0	0	0	2
333	26	1	134	308	0	1	0	10	0	0	0	3	0	0	1
449	1	1	20	2500	0	0	2	7	0	0	0	0	0	0	0
451	1	1	9	60	0	0	2	0	0	0	1	0	0	0	0
452	1	1	19	289	0	2	0	2	0	0	0	1	1	0	1
455	1	1	7	1000	0	0	1	0	0	0	0	0	0	0	0
457	1	1	8	1800	0	0	0	0	0	0	0	1	0	0	0
459	1	1	11	36	0	0	3	0	0	0	0	0	0	0	0
461	1	1	11	1125	0	3	0	0	0	0	1	1	1	0	0
470	1	1	6	200	0	0	0	0	0	0	0	0	0	0	2
472	2	R	23	600	0	1	1	0	0	0	0	0	0	0	0
472	3	R	15	625	0	1	0	3	0	0	0	0	0	0	0
472	3	T	36	960	0	2	0	1	0	1	2	0	0	0	0
474	1	1	7	1000	0	0	0	1	0	0	0	0	0	0	0
475	1	1	1	800	0	0	0	0	0	0	0	1	0	0	0
476	1	1	6	300	0	0	0	0	0	0	0	0	4	1	1
477	1	1	4	4500	0	0	0	1	0	0	0	0	0	1	1
478	1	1	6	4200	0	0	0	2	0	0	0	0	1	0	1
479	1	1	6	400	0	0	0	1	0	0	0	0	0	1	0
480	1	1	9	180	0	1	0	0	0	0	0	0	1	0	0
486	3	1	1	30	0	0	0	0	0	0	0	0	0	0	0
486	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0
486	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0
486	7	1	2	10	1	0	0	0	0	0	0	0	0	0	0
486	8	1	4	0	0	0	0	0	0	0	0	0	0	0	0
487	1	1	6	5050	1	0	0	0	0	0	0	0	0	0	0
488	1	1	23	1600	0	0	0	0	0	0	0	2	1	0	0
488	2	1	6	100	0	0	0	0	0	0	0	0	2	0	0
489	1	1	5	1750	0	0	0	0	0	1	1	0	0	0	0

Table A6.1: SACA All-Observed Lithic Attribute Samples: Tool Type Counts (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
490	1	1	26	4200	0	0	0	0	0	1	0	1	0	0	2
491	1	1	47	1050	1	4	0	4	3	1	0	0	1	0	4
492	1	1	20	450	0	2	0	3	0	0	0	0	0	0	0
493	1	1	41	10000	0	0	0	3	0	0	0	0	2	0	0
494	1	1	22	900	0	0	0	1	0	1	3	0	0	0	0
495	1	1	13	9	0	0	0	0	0	0	0	0	0	0	0
495	2	1	16	30	0	1	0	0	0	0	0	1	0	0	0
495	3	1	18	25	0	1	0	1	0	2	0	0	0	0	0
495	4	1	5	20	0	0	0	0	0	0	0	0	3	0	0
496	1	1	9	600	1	0	0	0	0	1	0	0	0	0	0
498	2	1	8	225	0	0	0	0	0	0	0	0	1	0	0
499	1	1	11	450	0	1	1	0	0	0	0	0	4	0	1

Table A6.2: SACA Other Lithic Attribute Samples: Tool Type Counts

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only
4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

Site no	Prov unit	Sample no	Sample type	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/ frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/ Type 3 biface	Mano	Metate	Hammer stone
226	1	1	2	25	40	0	0	0	1	1	1	0	0	0	1	3
227	1	1	2	63	4	0	1	0	3	0	1	0	0	1	0	0
228	1	1	5	46	50	0	2	0	3	0	0	1	0	0	1	2
229	1	1	3	7	800	0	0	0	0	0	0	0	0	4	0	3
232	2	1	8	5	.	0	0	0	0	0	0	0	0	0	0	1
234	1	1	4	3	300	0	0	0	0	0	0	0	0	2	0	1
234	2	1	8	28	51	0	2	0	0	0	1	0	1	0	2	0
234	3	1	.	12	.	0	0	0	0	0	0	0	1	4	0	7
248	1	B	3	7	81	0	0	0	0	0	0	0	3	3	0	0
248	1	C	3	14	525	1	7	0	3	1	1	0	0	0	0	0
270	9	D	3	17	504	0	2	0	0	2	0	0	0	5	1	3
270	22	1	.	24	.	0	3	0	1	0	1	0	0	2	0	1
450	1	1	2	8	16	0	0	0	2	0	0	0	0	0	0	0
452	1	9	.	1	.	0	0	0	0	0	0	1	0	0	0	0
453	1	1	2	26	4	0	0	0	0	0	0	0	1	0	0	0
454	1	1	8	9	4250	0	0	0	1	0	0	0	0	0	0	0
456	1	1	8	8	0	1	0	0	0	0	0	0	0	0	0	0
458	9	1	.	23	.	0	0	1	0	0	0	1	4	0	0	0
462	1	1	2	43	8	0	0	0	0	0	0	0	0	1	0	0
464	1	1	2	26	80	0	0	0	0	0	0	0	0	0	0	0
464	9	1	.	4	.	0	0	2	0	0	0	0	1	1	0	0
467	1	1	2	8	4	0	0	0	0	0	0	0	0	0	0	0
469	1	1	2	19	4	0	3	0	0	0	0	0	0	0	0	0
471	1	1	2	8	16	0	0	0	1	0	0	0	0	0	0	0
473	1	1	2	10	36	0	0	0	1	1	0	0	0	0	0	0

Table A6.3: SACA All-Observed Lithic Attribute Samples: Tool Type Percents

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
1	1	1	4	900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
2	1	1	6	25	33.3	0.0	33.3	0.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0
3	1	1	6	2500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1	1	6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
225	1	1	3	1220	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
229	2	1	36	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3	0.0	33.3
230	1	1	1	1250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
232	1	1	23	3600	14.3	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.1
233	1	1	37	100	0.0	0.0	0.0	0.0	28.6	14.3	0.0	0.0	14.3	14.3	28.6
235	1	1	39	1500	0.0	37.5	0.0	12.5	12.5	0.0	0.0	0.0	12.5	25.0	0.0
236	1	1	6	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
237	1	1	44	3400	10.5	5.3	5.3	68.4	0.0	10.5	0.0	0.0	0.0	0.0	0.0
238	1	1	16	1012	0.0	0.0	0.0	66.7	0.0	16.7	0.0	0.0	16.7	0.0	0.0
239	1	1	21	900	9.1	9.1	0.0	54.5	0.0	0.0	0.0	9.1	0.0	0.0	18.2
240	1	1	10	64	0.0	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0
240	2	1	10	240	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
240	3	1	8	88	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
241	1	1	59	1575	0.0	12.5	0.0	37.5	0.0	0.0	0.0	37.5	12.5	0.0	0.0
242	1	1	6	325	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0
243	1	1	21	8055	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
244	1	1	3	480	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
245	1	1	98	7280	5.9	5.9	0.0	41.2	5.9	5.9	0.0	0.0	29.4	0.0	5.9
246	1	1	10	11700	0.0	25.0	0.0	50.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0
246	2	1	62	0	5.0	20.0	5.0	5.0	0.0	0.0	0.0	10.0	25.0	5.0	25.0
247	1	1	26	2610	0.0	14.3	0.0	14.3	14.3	28.6	0.0	0.0	14.3	0.0	14.3
248	1	A	33	250	22.2	22.2	0.0	0.0	22.2	22.2	0.0	0.0	11.1	0.0	0.0
249	1	1	15	200	0.0	0.0	33.3	33.3	0.0	33.3	0.0	0.0	0.0	0.0	0.0
250	1	1	27	1000	0.0	40.0	0.0	20.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0
251	1	1	25	1000	0.0	25.0	0.0	37.5	0.0	0.0	0.0	0.0	37.5	0.0	0.0
252	1	1	33	3900	14.3	28.6	0.0	0.0	0.0	0.0	42.9	0.0	0.0	0.0	14.3
253	1	A	17	168	16.7	33.3	0.0	16.7	0.0	16.7	0.0	0.0	0.0	0.0	16.7
253	1	B	12	33	0.0	0.0	0.0	0.0	0.0	0.0	20.0	80.0	0.0	0.0	0.0
253	1	C	13	40	0.0	9.1	0.0	9.1	36.4	0.0	0.0	0.0	36.4	0.0	9.1
254	1	1	24	803	0.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	60.0	10.0	0.0
255	1	1	22	3600	12.5	25.0	0.0	12.5	0.0	0.0	0.0	0.0	12.5	0.0	37.5
257	1	1	1	150	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
260	1	1	7	1350	0.0	0.0	0.0	0.0	0.0	0.0	66.7	0.0	0.0	0.0	33.3
261	1	1	18	208	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
267	1	1	24	3200	0.0	18.2	0.0	9.1	0.0	36.4	0.0	0.0	18.2	0.0	18.2
268	1	1	18	21	0.0	40.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0	20.0
268	4	1	11	9	0.0	25.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	25.0
268	5	1	7	9	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	25.0	25.0
268	9	1	12	36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
269	1	1	4	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
270	5	A	36	1500	10.0	30.0	0.0	0.0	10.0	20.0	0.0	0.0	0.0	0.0	30.0
270	9	A	3	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
270	9	B	23	208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	28.6	0.0	28.6
270	9	C	14	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	50.0
270	12	A	30	126	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	50.0	0.0	0.0

Table A6.3: SACA All-Observed Lithic Attribute Samples: Tool Type Percents (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
270	12	B	34	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.5	18.2	0.0	27.3
272	1	1	13	2500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
277	1	1	36	.2275	12.5	12.5	0.0	0.0	0.0	12.5	0.0	0.0	0.0	37.5	25.0
290	1	1	25	3600	0.0	40.0	0.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0	20.0
291	1	A	7	154	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0
292	1	1	10	225	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
293	1	1	7	903	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
293	2	1	3	266	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
294	1	1	58	4500	12.5	31.3	0.0	6.3	0.0	0.0	12.5	18.8	12.5	0.0	6.3
295	1	1	3	300	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
296	1	1	24	1050	14.3	14.3	0.0	42.9	14.3	0.0	0.0	0.0	0.0	0.0	14.3
312	1	1	30	600	0.0	37.5	0.0	12.5	0.0	12.5	0.0	0.0	0.0	0.0	37.5
313	1	1	15	1000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
316	1	1	8	400	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
318	1	1	19	130	0.0	20.0	20.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0	20.0
319	1	1	13	1050	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
321	1	1	20	1400	0.0	20.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	20.0
325	1	1	10	1050	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
327	2	A	11	428	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
333	1	1	10	225	0.0	0.0	0.0	22.2	0.0	0.0	0.0	0.0	55.6	22.2	0.0
333	25	1	126	320	0.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
333	26	1	134	308	0.0	6.7	0.0	66.7	0.0	0.0	0.0	20.0	0.0	0.0	6.7
449	1	1	20	2500	0.0	0.0	22.2	77.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
451	1	1	9	60	0.0	0.0	66.7	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0
452	1	1	19	289	0.0	28.6	0.0	28.6	0.0	0.0	0.0	14.3	14.3	0.0	14.3
455	1	1	7	1000	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
457	1	1	8	1800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
459	1	1	11	36	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
461	1	1	11	1125	0.0	50.0	0.0	0.0	0.0	0.0	16.7	16.7	16.7	0.0	0.0
470	1	1	6	200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
472	2	R	23	600	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
472	3	R	15	625	0.0	25.0	0.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
472	3	T	36	960	0.0	33.3	0.0	16.7	0.0	16.7	33.3	0.0	0.0	0.0	0.0
474	1	1	7	1000	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
475	1	1	1	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
476	1	1	6	300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	16.7	16.7
477	1	1	4	4500	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	33.3	33.3
478	1	1	6	4200	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	25.0	0.0	25.0
479	1	1	6	400	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0
480	1	1	9	180	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0
486	3	1	1	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
486	4	1	1	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
486	5	1	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
486	7	1	2	10	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
486	8	1	4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
487	1	1	6	5050	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
488	1	1	23	1600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	33.3	0.0	0.0
488	2	1	6	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
489	1	1	5	1750	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0

Table A6.3: SACA All-Observed Lithic Attribute Samples: Tool Type Percents (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
490	1	1	26	4200	0.0	0.0	0.0	0.0	0.0	25.0	0.0	25.0	0.0	0.0	50.0
491	1	1	47	1050	5.6	22.2	0.0	22.2	16.7	5.6	0.0	0.0	5.6	0.0	22.2
492	1	1	20	450	0.0	40.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
493	1	1	41	10000	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0
494	1	1	22	900	0.0	0.0	0.0	20.0	0.0	20.0	60.0	0.0	0.0	0.0	0.0
495	1	1	13	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
495	2	1	16	30	0.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0
495	3	1	18	25	0.0	25.0	0.0	25.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0
495	4	1	5	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
496	1	1	9	600	50.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0
498	2	1	8	225	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
499	1	1	11	450	0.0	14.3	14.3	0.0	0.0	0.0	0.0	0.0	57.1	0.0	14.3

Table A6.4: SACA Other Lithic Attribute Samples: Tool Type Percents

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only
4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

Site no	Prov unit	Sample no	Sample type	Assem-blage total	Sample area (m)	Single plat cores	Multi-plat cores	Other/frag cores	In-formal tools	Uni-faces	Type 1 biface	Type 2 biface	Point/Type 3 biface	Mano	Metate	Hammer stone
226	1	1	2	25	40	0.0	0.0	0.0	14.3	14.3	14.3	0.0	0.0	0.0	14.3	42.9
227	1	1	2	63	4	0.0	16.7	0.0	50.0	0.0	16.7	0.0	0.0	16.7	0.0	0.0
228	1	1	5	46	50	0.0	22.2	0.0	33.3	0.0	0.0	11.1	0.0	0.0	11.1	22.2
229	1	1	3	7	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.1	0.0	42.9
232	2	1	8	5	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
234	1	1	4	3	300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	0.0	33.3
234	2	1	8	28	51	0.0	33.3	0.0	0.0	0.0	16.7	0.0	16.7	0.0	33.3	0.0
234	3	1	.	12	.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3	33.3	0.0	58.3
248	1	B	3	7	81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0
248	1	C	3	14	525	7.7	53.8	0.0	23.1	7.7	7.7	0.0	0.0	0.0	0.0	0.0
270	9	D	3	17	504	0.0	15.4	0.0	0.0	15.4	0.0	0.0	0.0	38.5	7.7	23.1
270	22	1	.	24	.	0.0	37.5	0.0	12.5	0.0	12.5	0.0	0.0	25.0	0.0	12.5
450	1	1	2	8	16	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
452	1	9	.	1	.	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
453	1	1	2	26	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
454	1	1	8	9	4250	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
456	1	1	8	8	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
458	9	1	.	23	.	0.0	0.0	16.7	0.0	0.0	0.0	16.7	66.7	0.0	0.0	0.0
462	1	1	2	43	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
464	1	1	2	26	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
464	9	1	.	4	.	0.0	0.0	50.0	0.0	0.0	0.0	0.0	25.0	25.0	0.0	0.0
467	1	1	2	8	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
469	1	1	2	19	4	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
471	1	1	2	8	16	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
473	1	1	2	10	36	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0

Table A6.5: SACA All-Observed Lithic Attribute Samples: Chipped Stone Material Types

Site no	Prov unit	Sample no	COUNTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc	TOTAL chipped stone	PERCENTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc
1	1	1	0	2	0	0	0	0	2	0.0	100.0	0.0	0.0	0.0	0.0
2	1	1	0	4	0	0	1	0	5	0.0	80.0	0.0	0.0	20.0	0.0
3	1	1	0	6	0	0	0	0	6	0.0	100.0	0.0	0.0	0.0	0.0
9	1	1	3	3	0	0	0	0	6	50.0	50.0	0.0	0.0	0.0	0.0
225	1	1	3	0	0	0	0	0	3	100.0	0.0	0.0	0.0	0.0	0.0
227	1	1	25	27	0	5	4	0	61	41.0	44.3	0.0	8.2	6.6	0.0
229	2	1	7	21	0	4	1	1	34	20.6	61.8	0.0	11.8	2.9	2.9
230	1	1	0	1	0	0	0	0	1	0.0	100.0	0.0	0.0	0.0	0.0
232	1	1	4	11	0	3	1	0	19	21.1	57.9	0.0	15.8	5.3	0.0
233	1	1	2	26	1	3	1	0	33	6.1	78.8	3.0	9.1	3.0	0.0
235	1	1	7	22	0	5	1	1	36	19.4	61.1	0.0	13.9	2.8	2.8
236	1	1	0	4	0	0	1	1	6	0.0	66.7	0.0	0.0	16.7	16.7
237	1	1	32	2	2	0	7	1	44	72.7	4.5	4.5	0.0	15.9	2.3
238	1	1	3	4	0	3	5	0	15	20.0	26.7	0.0	20.0	33.3	0.0
239	1	1	7	4	0	2	5	0	18	38.9	22.2	0.0	11.1	27.8	0.0
240	1	1	5	1	0	3	1	0	10	50.0	10.0	0.0	30.0	10.0	0.0
240	2	1	2	1	0	1	6	0	10	20.0	10.0	0.0	10.0	60.0	0.0
240	3	1	4	2	0	2	0	0	8	50.0	25.0	0.0	25.0	0.0	0.0
241	1	1	22	24	1	7	4	0	58	37.9	41.4	1.7	12.1	6.9	0.0
242	1	1	0	3	1	1	0	0	5	0.0	60.0	20.0	20.0	0.0	0.0
243	1	1	3	9	0	1	3	3	19	15.8	47.4	0.0	5.3	15.8	15.8
244	1	1	0	1	0	0	1	0	2	0.0	50.0	0.0	0.0	50.0	0.0
245	1	1	39	38	0	7	6	2	92	42.4	41.3	0.0	7.6	6.5	2.2
246	1	1	5	3	0	0	0	1	9	55.6	33.3	0.0	0.0	0.0	11.1
246	2	1	16	17	1	4	10	1	49	32.7	34.7	2.0	8.2	20.4	2.0
247	1	1	1	8	0	5	9	0	23	4.3	34.8	0.0	21.7	39.1	0.0
248	1	A	7	10	0	12	3	0	32	21.9	31.3	0.0	37.5	9.4	0.0
249	1	1	6	3	0	2	4	0	15	40.0	20.0	0.0	13.3	26.7	0.0
250	1	1	2	8	0	8	5	1	24	8.3	33.3	0.0	33.3	20.8	4.2
251	1	1	3	11	1	4	3	0	22	13.6	50.0	4.5	18.2	13.6	0.0
252	1	1	4	13	0	8	6	1	32	12.5	40.6	0.0	25.0	18.8	3.1
253	1	A	2	7	0	3	3	0	15	13.3	46.7	0.0	20.0	20.0	0.0
253	1	B	2	7	0	2	1	0	12	16.7	58.3	0.0	16.7	8.3	0.0
253	1	C	1	4	0	1	1	0	7	14.3	57.1	0.0	14.3	14.3	0.0
254	1	1	2	6	1	4	4	0	17	11.8	35.3	5.9	23.5	23.5	0.0
255	1	1	3	8	0	5	1	1	18	16.7	44.4	0.0	27.8	5.6	5.6
257	1	1	0	0	0	1	0	0	1	0.0	0.0	0.0	100.0	0.0	0.0
260	1	1	2	3	0	1	0	0	6	33.3	50.0	0.0	16.7	0.0	0.0
261	1	1	3	6	0	5	4	0	18	16.7	33.3	0.0	27.8	22.2	0.0
267	1	1	3	4	0	9	4	0	20	15.0	20.0	0.0	45.0	20.0	0.0
268	1	1	3	6	0	2	6	0	17	17.6	35.3	0.0	11.8	35.3	0.0
268	4	1	4	3	0	1	2	0	10	40.0	30.0	0.0	10.0	20.0	0.0
268	5	1	2	0	0	0	2	0	4	50.0	0.0	0.0	0.0	50.0	0.0
268	9	1	7	4	0	0	1	0	12	58.3	33.3	0.0	0.0	8.3	0.0
269	1	1	0	1	0	1	2	0	4	0.0	25.0	0.0	25.0	50.0	0.0
270	5	A	7	6	0	7	13	0	33	21.2	18.2	0.0	21.2	39.4	0.0
270	9	A	0	1	0	1	0	0	2	0.0	50.0	0.0	50.0	0.0	0.0
270	9	B	5	6	3	3	2	0	19	26.3	31.6	15.8	15.8	10.5	0.0

Table A6.5: SACA All-Observed Lithic Attribute Samples: Chipped Stone Material Types (Continued)

Site no	Prov unit	Sample no	COUNTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc	TOTAL chipped stone	PERCENTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc
270	9	C	2	3	0	5	3	0	13	15.4	23.1	0.0	38.5	23.1	0.0
270	12	A	5	13	2	8	0	0	28	17.9	46.4	7.1	28.6	0.0	0.0
270	12	B	5	15	3	5	1	0	29	17.2	51.7	10.3	17.2	3.4	0.0
270	22	1	2	7	0	3	9	0	21	9.5	33.3	0.0	14.3	42.9	0.0
272	1	1	1	2	0	10	0	0	13	7.7	15.4	0.0	76.9	0.0	0.0
277	1	1	5	10	0	11	4	0	30	16.7	33.3	0.0	36.7	13.3	0.0
290	1	1	0	11	0	6	7	0	24	0.0	45.8	0.0	25.0	29.2	0.0
291	1	A	2	1	0	1	3	0	7	28.6	14.3	0.0	14.3	42.9	0.0
292	1	1	2	1	0	5	2	0	10	20.0	10.0	0.0	50.0	20.0	0.0
293	1	1	1	1	0	2	3	0	7	14.3	14.3	0.0	28.6	42.9	0.0
293	2	1	1	0	0	2	0	0	3	33.3	0.0	0.0	66.7	0.0	0.0
294	1	1	15	24	0	7	8	1	55	27.3	43.6	0.0	12.7	14.5	1.8
295	1	1	2	1	0	0	0	0	3	66.7	33.3	0.0	0.0	0.0	0.0
296	1	1	3	7	0	5	8	0	23	13.0	30.4	0.0	21.7	34.8	0.0
312	1	1	11	15	0	1	0	0	27	40.7	55.6	0.0	3.7	0.0	0.0
313	1	1	2	11	0	2	0	0	15	13.3	73.3	0.0	13.3	0.0	0.0
316	1	1	1	0	0	1	5	0	7	14.3	0.0	0.0	14.3	71.4	0.0
318	1	1	2	2	0	4	10	0	18	11.1	11.1	0.0	22.2	55.6	0.0
319	1	1	2	6	0	2	1	1	12	16.7	50.0	0.0	16.7	8.3	8.3
321	1	1	3	4	0	5	5	0	17	17.6	23.5	0.0	29.4	29.4	0.0
325	1	1	3	4	0	2	1	0	10	30.0	40.0	0.0	20.0	10.0	0.0
327	2	A	1	1	0	6	3	0	11	9.1	9.1	0.0	54.5	27.3	0.0
333	1	1	0	2	0	0	0	0	2	0.0	100.0	0.0	0.0	0.0	0.0
333	25	1	7	99	1	11	5	0	123	5.7	80.5	0.8	8.9	4.1	0.0
333	26	1	35	78	5	12	3	0	133	26.3	58.6	3.8	9.0	2.3	0.0
449	1	1	8	5	1	1	4	1	20	40.0	25.0	5.0	5.0	20.0	5.0
451	1	1	3	1	0	3	2	0	9	33.3	11.1	0.0	33.3	22.2	0.0
452	1	1	6	9	0	1	2	0	18	33.3	50.0	0.0	5.6	11.1	0.0
455	1	1	2	1	0	1	3	0	7	28.6	14.3	0.0	14.3	42.9	0.0
457	1	1	4	2	0	1	1	0	8	50.0	25.0	0.0	12.5	12.5	0.0
459	1	1	2	2	0	3	4	0	11	18.2	18.2	0.0	27.3	36.4	0.0
461	1	1	2	1	0	1	6	0	10	20.0	10.0	0.0	10.0	60.0	0.0
467	1	1	5	0	0	2	0	1	8	62.5	0.0	0.0	25.0	0.0	12.5
470	1	1	1	1	0	0	1	1	4	25.0	25.0	0.0	0.0	25.0	25.0
472	2	R	9	5	0	5	3	1	23	39.1	21.7	0.0	21.7	13.0	4.3
472	3	R	2	3	0	9	0	1	15	13.3	20.0	0.0	60.0	0.0	6.7
472	3	T	17	0	0	18	0	0	35	48.6	0.0	0.0	51.4	0.0	0.0
474	1	1	2	0	0	1	3	0	6	33.3	0.0	0.0	16.7	50.0	0.0
475	1	1	0	1	0	0	0	0	1	0.0	100.0	0.0	0.0	0.0	0.0
477	1	1	0	0	2	0	0	0	2	0.0	0.0	100.0	0.0	0.0	0.0
478	1	1	2	1	0	0	1	0	4	50.0	25.0	0.0	0.0	25.0	0.0
479	1	1	2	1	0	0	2	0	5	40.0	20.0	0.0	0.0	40.0	0.0
480	1	1	4	2	0	0	0	1	7	57.1	28.6	0.0	0.0	0.0	14.3
486	3	1	1	0	0	0	0	0	1	100.0	0.0	0.0	0.0	0.0	0.0
486	4	1	0	0	0	1	0	0	1	0.0	0.0	0.0	100.0	0.0	0.0
486	5	1	1	0	0	0	0	0	1	100.0	0.0	0.0	0.0	0.0	0.0
486	7	1	1	0	0	0	1	0	2	50.0	0.0	0.0	0.0	50.0	0.0
486	8	1	2	1	0	1	0	0	4	50.0	25.0	0.0	25.0	0.0	0.0

Table A6.5: SACA All-Observed Lithic Attribute Samples: Chipped Stone Material Types (Continued)

Site no	Prov unit	Sample no	COUNTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc	TOTAL chipped stone	PERCENTS: Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc
487	1	1	1	0	0	5	0	0	6	16.7	0.0	0.0	83.3	0.0	0.0
488	1	1	11	8	0	1	0	2	22	50.0	36.4	0.0	4.5	0.0	9.1
488	2	1	3	1	0	0	0	0	4	75.0	25.0	0.0	0.0	0.0	0.0
489	1	1	1	3	0	1	0	0	5	20.0	60.0	0.0	20.0	0.0	0.0
490	1	1	1	16	1	5	0	1	24	4.2	66.7	4.2	20.8	0.0	4.2
491	1	1	6	26	1	5	4	0	42	14.3	61.9	2.4	11.9	9.5	0.0
492	1	1	3	8	0	4	5	0	20	15.0	40.0	0.0	20.0	25.0	0.0
493	1	1	8	27	0	2	2	0	39	20.5	69.2	0.0	5.1	5.1	0.0
494	1	1	2	19	0	1	0	0	22	9.1	86.4	0.0	4.5	0.0	0.0
495	1	1	4	6	0	0	3	0	13	30.8	46.2	0.0	0.0	23.1	0.0
495	2	1	4	4	0	4	4	0	16	25.0	25.0	0.0	25.0	25.0	0.0
495	3	1	0	14	0	3	1	0	18	0.0	77.8	0.0	16.7	5.6	0.0
495	4	1	1	0	0	0	1	0	2	50.0	0.0	0.0	0.0	50.0	0.0
496	1	1	0	6	0	1	2	0	9	0.0	66.7	0.0	11.1	22.2	0.0
498	2	1	3	0	0	2	2	0	7	42.9	0.0	0.0	28.6	28.6	0.0
499	1	1	0	0	0	1	4	1	6	0.0	0.0	0.0	16.7	66.7	16.7

Table A6.6: SACA Other Lithic Attribute Samples: Chipped Stone Material Types

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only 4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

				COUNTS:						TOTAL	PERCENTS:					
Site no	Prov unit	Sample no	Sample type	Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc	chipped stone	Chert /chal	Sil wood	Misc fine	Misc volc	Quart-zite	Other /misc
226	1	1	2	6	14	0	0	1	0	21	28.6	66.7	0.0	0.0	4.8	0.0
228	1	1	5	14	23	0	4	2	0	43	32.6	53.5	0.0	9.3	4.7	0.0
232	2	1	8	0	2	0	2	0	0	4	0.0	50.0	0.0	50.0	0.0	0.0
234	2	1	8	5	13	0	4	4	0	26	19.2	50.0	0.0	15.4	15.4	0.0
234	3	1	4	1	0	0	0	0	0	1	100.0	0.0	0.0	0.0	0.0	0.0
248	1	B	3	3	0	0	0	0	0	3	100.0	0.0	0.0	0.0	0.0	0.0
248	1	C	3	2	3	0	5	3	0	13	15.4	23.1	0.0	38.5	23.1	0.0
270	9	D	3	0	2	0	1	1	0	4	0.0	50.0	0.0	25.0	25.0	0.0
450	1	1	2	4	3	0	0	1	0	8	50.0	37.5	0.0	0.0	12.5	0.0
453	1	1	2	10	4	0	10	2	0	26	38.5	15.4	0.0	38.5	7.7	0.0
454	1	1	8	4	1	1	0	3	0	9	44.4	11.1	11.1	0.0	33.3	0.0
456	1	1	8	6	1	0	0	1	0	8	75.0	12.5	0.0	0.0	12.5	0.0
458	1	2	4	10	8	0	5	0	0	23	43.5	34.8	0.0	21.7	0.0	0.0
462	1	1	2	23	2	0	6	10	1	42	54.8	4.8	0.0	14.3	23.8	2.4
464	1	1	2	15	10	0	1	0	0	26	57.7	38.5	0.0	3.8	0.0	0.0
464	1	2	4	0	0	1	1	1	0	3	0.0	0.0	33.3	33.3	33.3	0.0
469	1	1	2	7	8	0	0	3	1	19	36.8	42.1	0.0	0.0	15.8	5.3
471	1	1	2	5	1	0	1	0	1	8	62.5	12.5	0.0	12.5	0.0	12.5
473	1	1	2	8	0	2	0	0	0	10	80.0	0.0	20.0	0.0	0.0	0.0

Table A6.7: SACA All-Observed Lithic Attribute Samples: Technological Indexes

Site no	Prov unit	Sample no	Assem-blage total	Flake/core index	3ry flake index	Deb A.D. prop	Deb W.F. prop	Deb F.F. prop	Deb use index	Formal tool index	Gr stone index
1	1	1	4	1.000	0.000	0.000	1.000	0.000	0.000	.	1.000
2	1	1	6	0.600	0.000	0.000	0.667	0.333	0.000	.	.
3	1	1	6	1.000	0.333	0.000	0.000	1.000	0.000	.	.
9	1	1	6	1.000	0.000	0.167	0.000	0.833	0.000	.	.
225	1	1	3	1.000	0.000	0.333	0.333	0.333	0.000	.	.
229	2	1	36	1.000	0.000	0.273	0.485	0.242	0.000	1.000	.
230	1	1	1	.	.	1.000	0.000	0.000	.	.	.
232	1	1	23	0.824	0.000	0.125	0.313	0.563	0.000	.	.
233	1	1	37	1.000	0.000	0.367	0.333	0.300	0.000	1.000	.
235	1	1	39	0.906	0.000	0.065	0.516	0.419	0.033	0.500	.
236	1	1	6	1.000	0.250	0.200	0.600	0.200	0.000	.	.
237	1	1	44	0.750	0.250	0.360	0.320	0.320	0.448	0.133	0.000
238	1	1	16	1.000	0.000	0.200	0.500	0.300	0.333	0.200	.
239	1	1	21	0.778	0.000	0.222	0.333	0.444	0.462	0.143	.
240	1	1	10	1.000	0.143	0.125	0.250	0.625	0.000	1.000	0.000
240	2	1	10	1.000	0.000	0.875	0.125	0.000	0.000	1.000	0.000
240	3	1	8	0.800	0.200	0.167	0.667	0.167	0.167	0.000	.
241	1	1	59	0.970	0.158	0.255	0.451	0.294	0.073	0.500	0.500
242	1	1	6	1.000	0.000	0.500	0.000	0.500	0.333	0.000	1.000
243	1	1	21	1.000	0.000	0.444	0.167	0.389	0.091	0.000	.
244	1	1	3	0.000	.	1.000	0.000	0.000	.	.	.
245	1	1	98	0.970	0.059	0.139	0.519	0.342	0.093	0.222	.
246	1	1	10	0.857	0.000	0.000	0.667	0.333	0.250	0.000	.
246	2	1	62	0.806	0.000	0.375	0.350	0.275	0.038	0.667	.
247	1	1	26	0.909	0.091	0.389	0.500	0.111	0.083	0.750	0.000
248	1	A	33	0.833	0.000	0.167	0.667	0.167	0.000	1.000	0.200
249	1	1	15	0.889	0.000	0.333	0.583	0.083	0.111	0.500	0.000
250	1	1	27	0.875	0.000	0.333	0.524	0.143	0.067	0.000	.
251	1	1	25	0.818	0.000	0.471	0.353	0.176	0.250	0.000	1.000
252	1	1	33	0.864	0.050	0.231	0.462	0.308	0.000	1.000	0.000
253	1	A	17	0.500	0.250	0.600	0.200	0.200	0.200	0.500	0.000
253	1	B	12	1.000	0.000	0.286	0.571	0.143	0.000	1.000	.
253	1	C	13	0.500	0.000	0.000	1.000	0.000	0.500	0.800	0.000
254	1	1	24	1.000	0.100	0.286	0.500	0.214	0.231	0.000	1.000
255	1	1	22	0.813	0.000	0.071	0.500	0.429	0.071	0.000	.
257	1	1	1	1.000	0.000	0.000	1.000	0.000	0.000	.	.
260	1	1	7	1.000	0.000	0.250	0.750	0.000	0.000	1.000	0.000
261	1	1	18	1.000	0.000	0.118	0.471	0.412	0.063	0.000	.
267	1	1	24	0.778	0.000	0.462	0.308	0.231	0.125	0.800	1.000
268	1	1	18	0.818	0.000	0.308	0.462	0.231	0.000	1.000	0.000
268	4	1	11	0.857	0.000	0.143	0.429	0.429	0.000	1.000	0.000
268	5	1	7	0.667	0.000	0.333	0.667	0.000	0.000	.	.
268	9	1	12	1.000	0.125	0.200	0.400	0.400	0.000	1.000	0.000
269	1	1	4	1.000	0.000	0.250	0.500	0.250	0.000	.	.
270	5	A	36	0.818	0.000	0.308	0.385	0.308	0.000	1.000	0.000
270	9	A	3	1.000	0.000	0.000	1.000	0.000	0.000	.	.
270	9	B	23	1.000	0.000	0.313	0.125	0.563	0.000	1.000	0.000
270	9	C	14	1.000	0.000	0.333	0.417	0.250	0.000	1.000	.
270	12	A	30	1.000	0.053	0.269	0.385	0.346	0.000	1.000	0.000

Table A6.7: SACA All-Observed Lithic Attribute Samples: Technological Indexes (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Flake/core index	3ry flake index	Deb A.D. prop	Deb W.F. prop	Deb F.F. prop	Deb use index	Formal tool index	Gr stone index
270	12	B	34	1.000	0.056	0.217	0.478	0.304	0.000	1.000	0.143
272	1	1	13	1.000	0.000	0.000	0.750	0.250	0.000	.	.
277	1	1	36	0.913	0.087	0.148	0.296	0.556	0.000	1.000	0.000
290	1	1	25	0.895	0.000	0.150	0.500	0.350	0.056	0.500	0.000
291	1	A	7	0.800	0.000	0.200	0.800	0.000	0.000	1.000	0.000
292	1	1	10	1.000	0.000	0.444	0.556	0.000	0.000	1.000	0.000
293	1	1	7	1.000	0.000	0.286	0.429	0.286	0.000	.	.
293	2	1	3	0.667	0.000	0.000	0.000	1.000	0.000	.	.
294	1	1	58	0.788	0.037	0.357	0.381	0.262	0.036	0.833	1.000
295	1	1	3	0.500	0.000	0.500	0.000	0.500	0.000	.	.
296	1	1	24	0.867	0.000	0.235	0.588	0.176	0.188	0.250	0.000
312	1	1	30	0.824	0.176	0.227	0.273	0.500	0.056	0.500	.
313	1	1	15	1.000	0.000	0.267	0.267	0.467	0.000	.	.
316	1	1	8	0.833	0.000	0.167	0.667	0.167	0.000	.	.
318	1	1	19	0.750	0.000	0.571	0.286	0.143	0.143	0.500	.
319	1	1	13	1.000	0.000	0.200	0.300	0.500	0.000	1.000	.
321	1	1	20	0.818	0.000	0.308	0.462	0.231	0.100	0.500	.
325	1	1	10	0.857	0.000	0.333	0.444	0.222	0.000	.	.
327	2	A	11	1.000	0.000	0.455	0.273	0.273	0.000	.	.
333	1	1	10	.	.	.	.	.	1.000	0.000	1.000
333	25	1	126	1.000	0.010	0.111	0.402	0.487	0.055	0.000	.
333	26	1	134	0.988	0.184	0.176	0.412	0.412	0.093	0.231	0.000
449	1	1	20	0.833	0.000	0.091	0.545	0.364	0.412	0.000	.
451	1	1	9	0.667	0.000	0.333	0.667	0.000	0.000	1.000	.
452	1	1	19	0.750	0.000	0.333	0.556	0.111	0.250	0.333	.
455	1	1	7	0.750	0.000	0.500	0.500	0.000	0.000	.	.
457	1	1	8	1.000	0.000	0.429	0.429	0.143	0.000	1.000	0.000
459	1	1	11	0.700	0.000	0.125	0.625	0.250	0.000	.	.
461	1	1	11	0.571	0.000	0.200	0.800	0.000	0.000	1.000	0.000
470	1	1	6	1.000	0.000	0.000	0.500	0.500	0.000	.	.
472	2	R	23	0.895	0.000	0.150	0.300	0.550	0.000	.	.
472	3	R	15	0.875	0.222	0.182	0.727	0.091	0.250	0.000	.
472	3	T	36	0.895	0.000	0.414	0.172	0.414	0.056	0.750	0.000
474	1	1	7	1.000	0.000	0.400	0.600	0.000	0.250	0.000	.
475	1	1	1	.	.	.	.	.	.	1.000	.
476	1	1	6	.	.	.	.	.	.	.	1.000
477	1	1	4	.	.	1.000	0.000	0.000	1.000	0.000	.
478	1	1	6	1.000	0.000	0.000	0.500	0.500	0.500	0.000	.
479	1	1	6	1.000	0.000	0.000	0.750	0.250	0.200	0.000	.
480	1	1	9	0.667	0.000	0.600	0.400	0.000	0.000	.	.
486	3	1	1	1.000	0.000	0.000	1.000	0.000	0.000	.	.
486	4	1	1	1.000	0.000	0.000	1.000	0.000	0.000	.	.
486	5	1	1	1.000	0.000	0.000	1.000	0.000	0.000	.	.
486	7	1	2	0.500	0.000	0.000	1.000	0.000	0.000	.	.
486	8	1	4	1.000	0.000	0.250	0.500	0.250	0.000	.	.
487	1	1	6	0.800	0.000	0.200	0.600	0.200	0.000	.	.
488	1	1	23	1.000	0.158	0.050	0.250	0.700	0.000	1.000	1.000
488	2	1	6	1.000	0.250	0.000	0.000	1.000	0.000	.	1.000
489	1	1	5	1.000	0.000	0.000	0.667	0.333	0.000	1.000	.

Table A6.7: SACA All-Observed Lithic Attribute Samples: Technological Indexes (Continued)

Site no	Prov unit	Sample no	Assem-blage total	Flake/core index	3ry flake index	Deb A.D. prop	Deb W.F. prop	Deb F.F. prop	Deb use index	Formal tool index	Gr stone index
490	1	1	26	1.000	0.056	0.182	0.636	0.182	0.000	1.000	.
491	1	1	47	0.808	0.000	0.276	0.517	0.207	0.160	0.500	0.000
492	1	1	20	0.750	0.000	0.600	0.267	0.133	0.333	0.000	.
493	1	1	41	1.000	0.074	0.250	0.250	0.500	0.100	0.000	.
494	1	1	22	1.000	0.588	0.000	0.412	0.588	0.056	0.800	0.000
495	1	1	13	1.000	0.091	0.154	0.538	0.308	0.000	.	.
495	2	1	16	0.909	0.091	0.214	0.500	0.286	0.000	1.000	0.000
495	3	1	18	0.923	0.077	0.071	0.643	0.286	0.071	0.667	.
495	4	1	5	.	1.000	0.500	0.500	0.000	0.000	.	.
496	1	1	9	0.833	0.167	0.143	0.429	0.429	0.000	1.000	.
498	2	1	8	1.000	0.000	0.143	0.714	0.143	0.000	.	1.000
499	1	1	11	0.667	0.000	0.000	0.500	0.500	0.000	.	.

Table A6.8: SACA Other Lithic Attribute Samples: Technological Indexes

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only 4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

Site no	Prov unit	Sample no	Sample type	Assem-blage total	Flake/core index	3ry flake index	Deb A.D. prop	Deb W.F. prop	Deb F.F. prop	Deb use index	Formal tool index	Gr stone index
226	1	1	2	25	1.000	0.000	0.444	0.278	0.278	0.091	0.667	0.000
227	1	1	2	63	0.966	0.034	0.482	0.286	0.232	0.094	0.250	1.000
228	1	1	5	46	0.931	0.000	0.270	0.405	0.324	0.100	0.250	.
229	1	1	3	7	.	.	.	.	.	.	.	1.000
232	2	1	8	5	1.000	0.000	0.500	0.000	0.500	0.000	.	.
234	1	1	4	3	.	.	.	.	.	.	.	1.000
234	2	1	8	28	0.905	0.050	0.091	0.364	0.545	0.000	1.000	0.000
234	3	1	.	12	.	.	.	.	.	.	1.000	1.000
248	1	B	3	7	.	.	.	.	.	.	1.000	0.000
248	1	C	3	14	0.000	.	.	.	.	1.000	0.400	0.000
270	9	D	3	17	0.000	.	.	.	.	.	1.000	0.000
270	22	1	.	24	0.700	0.000	0.563	0.313	0.125	0.125	0.500	.
450	1	1	2	8	1.000	0.000	0.667	0.167	0.167	0.500	0.000	.
452	1	9	.	1	.	.	.	.	.	.	1.000	.
453	1	1	2	26	1.000	0.000	0.480	0.320	0.200	0.000	1.000	.
454	1	1	8	9	1.000	0.000	0.125	0.500	0.375	0.125	0.000	.
456	1	1	8	8	0.667	0.333	0.571	0.286	0.143	0.000	.	.
458	9	1	.	23	0.889	0.111	0.471	0.294	0.235	0.000	1.000	.
462	1	1	2	43	1.000	0.069	0.310	0.476	0.214	0.000	.	.
464	1	1	2	26	1.000	0.524	0.160	0.640	0.200	0.000	.	.
464	9	1	.	4	0.000	.	.	.	.	.	1.000	0.000
467	1	1	2	8	1.000	0.000	0.250	0.625	0.125	0.000	.	.
469	1	1	2	19	0.727	0.111	0.438	0.375	0.188	0.000	.	.
471	1	1	2	8	1.000	0.000	0.500	0.167	0.333	0.250	0.000	.
473	1	1	2	10	1.000	0.000	0.375	0.125	0.500	0.167	0.500	.

Table A6.9: SACA Lithic Narrative Data Summary: Material Types

Site	Prov unit	Sample no	DOMINANT: Q-zite	Chal p-wood	Reg p-wood	Cryst volc	Rhyo-lite	Chert	COMMON: Q-zite	Chal p-wood	Reg p-wood	Cryst volc	Rhyo-lite	Chert
185	1	A	X										X	X
185	1	B	X											
248	1	Trash							X		X	X	X	
253	1	C							X		X		X	X
258	1	1	X									X	X	
262	1	1	X		X					X				
263	1	Roomblk							X			X		
263	1	Trash				X				X			X	X
263	2	1				X	X							
263	3	Roomblk	X											
263	3	Trash								X	X	X		X
264	1	1							X	X				X
264	2	1		X					X					X
265	1	1							X		X	X		X
266	1	1							X	X			X	X
266	2	1							X					
270	17	A							X	X				X
270	17	B							X	X			X	
270	18	A							X	X	X			X
270	18	B		X										
270	18	C	X											
273	1	1							X		X	X		X
273	2	1								X		X	X	
273	4	1								X	X	X		X
274	1	A								X	X	X	X	
274	1	B									X	X		X
274	1	1									X	X	X	X
275	1	1							X					
275	3	1								X	X		X	X
276	1	A							X		X		X	X
276	1	B									X	X	X	
278	1	1								X	X		X	X
278	2	1			X					X				X
278	3	1						X		X	X		X	
278	4	1		X	X								X	X
278	5	1								X	X		X	X
278	6	1						X			X	X	X	
278	7	1			X					X			X	X
278	9	1		X				X	X				X	
278	10	1						X						
278	11	1								X	X		X	X
279	1	1					X		X		X			
280	1	A					X		X	X	X			
280	2	A					X							
280	2	B					X							X
280	2	C			X		X			X				X
281	1	A								X			X	X
291	1	B		X					X			X		

Table A6.9: SACA Lithic Narrative Data Summary: Material Types (Continued)

Site	Prov unit	Sample no	DOMINANT: Q-zite	Chal p-wood	Reg p-wood	Cryst volc	Rhyo-lite	Chert	COMMON: Q-zite	Chal p-wood	Reg p-wood	Cryst volc	Rhyo-lite	Chert
291	2	1							X		X		X	X
291	3	1							X	X			X	
311	1	1	X					X	X	X				
311	2	1		X										X
311	3	1	X							X				X
314	1	1				X			X				X	X
322	1	1		X							X			X
322	2	1		X										X
322	3	1		X					X		X			
322	4	1		X								X	X	X
324	1	A				X				X				X
324	1	B									X	X	X	X
326	1	Roomblk								X			X	
326	1	Trash								X	X	X	X	
326	3	Trash		X					X			X		
327	1	1									X	X	X	
327	2	A								X		X	X	X
328	1	1	X		X								X	
328	2	1	X							X	X		X	
328	3	1	X	X									X	
328	4	1		X							X			
329	1	1					X		X		X			
330	1	A					X		X		X			
330	1	B			X				X	X			X	
330	2	A							X	X		X	X	
330	2	B					X		X	X				
330	3	A							X		X	X	X	
330	3	B					X		X		X	X		
331	1	1	X				X			X				
331	2	1							X	X			X	
331	3	1							X	X			X	
331	4	1							X		X	X		
429	1	1	X									X		X
452	1	1								X			X	
452	2	1							X	X	X		X	
452	3	1							X	X			X	X
452	4	1							X	X			X	X
452	5	1							X	X				X
452	6	1		X										
468	1	1							X				X	X
468	2	1							X				X	X
485	1	1			X									

Table A6.10: SACA Lithic Narrative Data Summary: Chippped and Ground Stone Tools

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only
4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

Site	Prov unit	Sample no	Sample type	Sample area	No items coded	Est items present	Blade cores	Multi plat cores	In-formal tools	Uni-faces	Type 1 bif's	Type 2 bif's	Type 3 bif's	Proj pts	Manos	Metates	Hammer stones	Other/ indet tools
185	1	A	2	25	0	26-100	1	0	2	1	.	.	.	.	.	1	1	2
185	1	B	1	204	0	10-25	1	0	.	.	.	.	.	.	.	1	7	5
248	1	T	0	3600	0	500 +	0	0	.	.	.	.	.	.	.	.	.	.
253	1	C	1	40	9	26-100	0	0	.	.	.	.	.	.	.	.	.	.
258	1	1	0	0	0	500 +	0	4	.	.	.	.	.	.	.	.	.	.
262	1	1	1	1350	83	26-100	0	2	.	5	.	.	.	.	.	1	.	.
263	1	R	1	1125	0	10-25	0	0	.	.	.	.	.	.	.	6	2	1
263	1	T	1	544	0	26-100	0	0	.	.	1	.	1	.	.	.	.	.
263	2	1	1	875	0	1-9	0	0	.	.	.	.	.	.	.	.	.	.
263	3	R	1	1000	0	1-9	0	1	.	.	.	.	.	.	.	.	.	.
263	3	T	1	384	0	26-100	1	0	.	.	1	.	.	.	.	.	.	1
264	1	1	1	900	0	26-100	0	0	1	2	.	1	.	2	.	1	1	.
264	2	1	1	100	0	26-100	0	0	4	.	.	.	.	.	.	1	.	.
265	1	1	1	3500	0	10-25	0	1	1	2	.	1	.	.	.	2	.	.
266	1	1	1	100	0	26-100	0	0	2	2	2	.	.	1	.	.	.	.
266	2	1	4	1500	0	10-25	0	0	1	1	.	5	1	.	.	1	.	.
270	17	A	1	450	0	26-100	2	2	2	.	1	.	.	4	.	1	4	5
270	17	B	1	600	0	26-100	2	0	2	.	.	.	.	.	.	2	2	1
270	18	A	2	16	0	26-100	0	2	.	.	.	.	.	.	.	.	.	.
270	18	B	1	225	0	26-100	0	0	.	.	.	1	.	.	.	.	.	.
270	18	C	3	1500	0	26-100	3	5	.	.	1	.	.	.	.	2	9/9+	.
273	1	1	1	80	0	26-100	1	0	.	.	.	.	.	.	.	1	3	.
273	2	1	1	16	0	26-100	1	1	2	.	.	.	.	.	.	.	9/9+	3
273	4	1	1	120	0	26-100	1	2	5	.	1	.	.	.	.	1	4	.
274	1	A	2	24	0	26-100	2	2	3	.	.	1	.	.	.	1	.	1
274	1	B	5	70	0	26-100	0	1	3	1	1	.	.	.	.	1	1	.
274	1	1	4	2500	0	10-25	0	1	1	.	1	.	.	1	.	2	5	.
275	1	1	4	750	0	10-25	0	3	4	1	.	3	.	.	.	.	.	.
275	3	1	5	24	0	26-100	0	7	4	1	2	.	1	.	.	1	.	.
276	1	A	1	280	0	26-100	1	5	1	.	.	.	.	.	.	2	5	.
276	1	B	1	364	0	26-100	6	1	1	.	.	.	.	.	.	3	2	.
278	1	1	1	450	0	10-25	1	1	.	.	1	.	.	.	.	.	1	.
278	2	1	1	250	0	10-25	1	1	.	.	.	.	.	.	.	2	.	.
278	3	1	1	110	0	26-100	0	1	.	.	1	1	.	.	.	.	1	.
278	4	1	1	36	0	1-9	0	0	.	.	.	.	.	.	.	1	.	.
278	5	1	1	96	0	10-25	0	0	.	.	.	.	1	.	.	1	.	.
278	6	1	1	90	0	10-25	0	0	.	.	.	.	.	.	.	.	.	.
278	7	1	1	63	0	26-100	0	1	.	.	.	1	.	.	.	3	.	.
278	9	1	1	240	0	10-25	0	0	.	.	.	.	.	.	.	.	.	.
278	10	1	0	6	0	1-9	0	1	.	.	.	.	.	.	.	.	.	.
278	11	1	1	72	0	10-25	1	0	.	.	1	.	.	.	.	.	.	.
279	1	1	1	1750	0	26-100	1	1	.	.	1	.	.	.	.	2	.	.
280	1	A	1	3600	0	26-100	1	3	6	1	1	.	2	.	.	4	9/9+	1
280	2	A	1	35	0	1-9	0	1	.	.	.	.	.	.	.	1	1	.
280	2	B	1	45	0	10-25	0	0	.	.	.	.	.	.	.	.	.	.
280	2	C	1	1650	0	10-25	0	1	3	2	.	1	.	.	.	3	1	.
281	1	A	1	2250	0	10-25	2	0	1	1	.	.	.	.	.	.	.	1

Table A6.10: SACA Lithic Narrative Data Summary: Chippped and Ground Stone Tools (Continued)

Sample type codes: 0=None 1=All observed 2=Quadrat 3=Tools only
4=Tools outside sample 5=Midden/trash area 8=Other 9=Unknown.

Site	Prov unit	Sample no	Sample type	Sample area	No items coded	Est items present	Blade cores	Multi plat cores	In-formal tools	Uni-faces	Type 1 bif's	Type 2 bif's	Type 3 bif's	Proj pts	Manos	Metates	Hammer stones	Other/ indet tools
291	1	B	2	16	0	101-500	1	2	4	.	.	2	.	2	.	.	.	.
291	2	1	2	40	0	500 +	1	0	.	.	.	.	.	.	.	1	2	.
291	3	1	1	640	0	10-25	0	1	.	.	.	.	.	.	.	1	.	1
311	1	1	1	25	83	26-100	0	5	.	.	1	.	.	1	.	3	.	1
311	2	1	1	150	40	26-100	0	3	2	.	2	.	.	.	.	.	2	1
311	3	1	1	200	40	26-100	0	1	.	.	.	.	.	.	.	.	2	1
314	1	1	2	25	43	26-100	0	0	4	.	.	.	.	.	.	1	.	.
322	1	1	1	700	0	26-100	0	5	5	.	.	.	.	1	.	9/9+	1	3
322	2	1	1	4000	0	26-100	0	3	4	.	1	.	1	2	.	1	.	.
322	3	1	1	3750	0	26-100	0	1	3	.	.	.	.	.	.	2	1	.
322	4	1	1	2500	0	26-100	0	0	.	.	1	.	.	.	.	.	.	1
324	1	A	1	150	0	1-9	0	0	.	.	.	.	.	.	.	.	.	.
324	1	B	1	225	0	26-100	0	0	.	.	.	1	.	.	.	.	1	.
326	1	R	1	300	0	10-25	0	0	.	.	2	.	.	.	.	.	4	.
326	1	T	1	255	0	26-100	1	2	4	.	.	.	.	.	.	.	2	.
326	3	T	1	450	0	26-100	0	0	.	.	2	.	.	.	.	.	1	1
327	1	1	1	700	0	101-500	1	1	.	.	.	.	.	.	.	1	.	2
327	2	A	1	428	0	101-500	0	0	.	.	.	1	1	.	.	1	.	.
328	1	1	1	1575	0	26-100	2	4	.	.	2	.	.	.	.	.	1	.
328	2	1	1	72	0	1-9	0	0	.	.	.	.	.	.	.	.	.	.
328	3	1	1	400	0	10-25	2	2	.	.	.	.	.	1	.	1	2	.
328	4	1	1	100	0	1-9	0	0	.	1	.	.	.	.	.	1	1	.
329	1	1	1	667	0	1-9	0	0	.	.	.	.	1	.	.	.	.	.
330	1	A	2	36	0	26-100	0	4	1	1	.	.	.	.	.	.	1	.
330	1	B	2	25	0	10-25	0	0	1	.	.	.	.	.	.	1	.	1
330	2	A	1	1200	0	26-100	2	1	5	.	.	.	.	.	.	.	.	3
330	2	B	1	729	0	10-25	0	3	1	.	.	.	.	.	.	.	1	3
330	3	A	2	100	0	26-100	0	2	.	1	.	.	.	.	.	1	.	.
330	3	B	1	880	0	10-25	0	0	.	.	.	.	.	.	.	3	.	6
331	1	1	1	3000	0	101-500	3	9 or more	3	2	1	.	.	.	.	1	7	9/9+
331	2	1	2	16	0	26-100	0	1	1	.	.	.	.	.	.	1	1	4
331	3	1	1	700	0	1-9	0	1	.	.	.	.	.	.	.	1	.	3
331	4	1	2	16	0	26-100	0	0	.	.	.	.	.	.	.	.	1	2
429	1	1	2	25	0	26-100	0	4	5	2	.	.	.	.	.	.	2	5
452	1	1	1	289	0	10-25	0	0	.	.	1	2	.	.	.	.	1	.
452	2	1	1	924	0	26-100	2	2	.	.	1	1	.	.	.	2	1	.
452	3	1	1	800	0	26-100	0	4	.	.	6	1	.	.	.	1	.	.
452	4	1	1	1485	0	26-100	2	8	.	.	1	1	.	.	.	1	2	.
452	5	1	1	1880	0	26-100	0	3	.	1	1	2	.	1	.	3	.	.
452	6	1	1	414	0	10-25	0	1	.	.	2	1	.	.	.	1	.	1
468	1	1	2	4	69	26-100	0	0	.	.	.	.	.	.	.	.	.	.
468	2	1	2	4	11	10-25	0	1	.	.	.	.	.	.	.	.	.	.
485	1	1	8	.	0	26-100	0	0	.	.	.	.	.	.	.	.	1	.

Table A6.11: SACA Lithic Narrative Data Summary: Reduction Sequence

Site	Prov unit	Sample no	DOMINANT: Primary	Secondary	Tertiary	Other	COMMON: Primary	Secondary	Tertiary	Other
291	2	1					X	X	X	
291	3	1					X	X	X	
311	1	1	X						X	
311	2	1			X		X	X		
311	3	1		X					X	
314	1	1			X		X	X		
322	1	1			X					
322	2	1			X		X	X		
322	3	1		X	X					
322	4	1			X	X				
324	1	A						X	X	
324	1	B			X					
326	1	Roomblk						X	X	
326	1	Trash			X			X		
326	3	Trash					X	X	X	
327	1	1							X	
327	2	A			X			X		
328	1	1		X	X					
328	2	1		X	X		X			
328	3	1		X	X					
328	4	1			X					
329	1	1			X		X	X		
330	1	A		X	X		X			
330	1	B		X	X					
330	2	A			X		X	X		
330	2	B					X	X	X	
330	3	A			X		X	X		
330	3	B		X					X	
331	1	1			X		X	X		
331	2	1			X		X	X		
331	3	1					X		X	
331	4	1			X		X	X		
429	1	1		X	X		X			
452	1	1					X	X		
452	2	1					X	X	X	
452	3	1						X	X	
452	4	1					X	X	X	
452	5	1						X	X	
452	6	1						X	X	
468	1	1						X	X	
468	2	1					X		X	
485	1	1	X					X		

Table A6.11: SACA Lithic Narrative Data Summary: Reduction Sequence (Continued)

Site	Prov unit	Sample no	DOMINANT: Primary	Secondary	Tertiary	Other	COMMON: Primary	Secondary	Tertiary	Other
185	1	A		X	X		X			
185	1	B			X					
248	1	Trash	X					X	X	
253	1	C			X		X	X		
258	1	1	X					X		
262	1	1			X			X		
263	1	Roomblk	X							
263	1	Trash					X	X	X	
263	2	1		X	X					
263	3	Roomblk								
263	3	Trash						X	X	
264	1	1			X			X		
264	2	1			X			X		
265	1	1						X	X	
266	1	1			X		X	X		
266	2	1						X		
270	17	A						X	X	
270	17	B					X	X	X	
270	18	A		X					X	
270	18	B			X			X		
270	18	C								
273	1	1						X	X	
273	2	1					X	X	X	
273	4	1			X			X		
274	1	A			X		X	X		
274	1	B						X	X	
274	1	1								
275	1	1								
275	3	1					X	X	X	
276	1	A					X	X	X	
276	1	B					X	X	X	
278	1	1			X			X		
278	2	1					X	X	X	
278	3	1						X	X	
278	4	1		X	X		X			
278	5	1		X			X		X	
278	6	1	X					X	X	
278	7	1			X			X		
278	9	1		X	X		X			
278	10	1								
278	11	1	X					X		
279	1	1			X		X	X		
280	1	A					X	X	X	
280	2	A	X	X						
280	2	B	X	X						
280	2	C		X			X		X	
281	1	A					X	X	X	
291	1	B						X	X	

Bibliography

Ammerman, A.J., and M.W. Feldman
1978 Replicated collections of site surfaces. *American Antiquity* 43:734-740.

Baker, C.M.
1978 The size effect: An explanation of variability in surface artifact assemblage content. *American Antiquity* 43:288-293.

Bannister, B.J., W. Hannah, and W.J. Robinson
1970 *Tree-ring dates from New Mexico M-N, S, Z, southwestern New Mexico area.* Laboratory of Tree-ring Research, University of Arizona, Tucson.

Barnett, F.
1974 Sandstone Hill Pueblo ruin. Albuquerque Archaeological Society.

Beckett, Patrick H.
1973 Cochise culture sites in south-central and north-central New Mexico. M.A. thesis, Department of Anthropology, Eastern New Mexico University, Portales.

Berman, Mary Jane
1979 *Cultural resources overview, Socorro Area, New Mexico.* Bureau of Land Management, New Mexico State Office, and USDA Forest Service, Southwest Region, Santa Fe and Albuquerque.

Berry, B.J.L., and A. Baker
1968 Geographical sampling. *In Spatial analysis: a reader in statistical geography*, edited by B.J.L. Berry and D.F. Marble, pp. 91-100. Prentice-Hall, Englewood Cliffs, NJ.

Berry, M.S.
1980 Time, space and transition in Anasazi prehistory. Unpublished Ph.d. dissertation, University of Utah, Salt Lake City.

Binford, Lewis R.
1978 Dimensional analysis of behavior and site structure: Learning from an Eskimo hunting stand. *American Antiquity* 1:5-13.
1979 Organization and formation processes: Looking at curated technologies. *Journal of Anthropological Research* 35:255-273.
1980 Willow smoke and dogs' tails: Hunter-gatherer settlement systems and archaeological site formation. *American Antiquity* 45:4-20.
1982 The archaeology of place. *Journal of Anthropological Research* 1:5-31.
1983 *In pursuit of the past: Decoding the archaeological record.* Thames and Hudson, New York.

Blalock, H.M.
1960 *Social statistics*. McGraw-Hill, New York.

Blomberg, Belinda
1979 Seasonality in Navajo sites and its effect on a multivariate technique for predicting interior floor space. Manuscript in files of the author.

Brew, J.O., and E.B. Danson
1948 The 1947 reconnaissance and the proposed Upper Gila Expedition of the Peabody Museum of Harvard. *El Palacio* 57: 211-222.

Bullard, W.R., Jr.
1962 The Cerro Colorado site and pithouse architecture in the southwestern United States prior to A.D. 900. *Papers of the Peabody Museum of Archaeology and Ethnology* 44(2). Harvard University, Cambridge.

Callahan, Errett
1979 The basis of biface knapping in the Eastern fluted point tradition, a manual for flintknappers and lithic analysis. *Archaeology of Eastern North America* (1).

Camilli, Eileen
1981 The ash disposal and evaporation pond site. *Coronado Series 3, Museum of Northern Arizona Research Paper 22.* Flagstaff, AZ.
1983 Site occupational history and lithic assemblage structure: An example from southeastern Utah. Unpublished Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Camilli, Eileen L., and Margaret C. Nelson
n.d. Ladder Ranch field school - guide to lithic analysis. On file at the Department of Anthropology, University of New Mexico, Albuquerque.

Cannon, Aubrey
1983 The quantification of artifactual assemblages: Some implications for behavioral inferences. *American Antiquity* 48:485-492.

Carlson, Roy L.
1970 White Mountain redware: a pottery tradition of east-central Arizona and western New Mexico. *Anthropological Papers* 19, University of Arizona, Tucson.

Chapman, Richard
1977 Analysis of the lithic assemblages. In *Settlement and Subsistence Along the Lower Chaco River: the CGP Survey*, edited by C.A. Reher, pp. 371-452. University of New Mexico Press, Albuquerque.
1980 The Archaic Period in the American Southwest: Facts and Fantasy. Unpublished Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Chapman, Richard, and J.A. Schutt
1977 Methodology of lithic analysis. In *Archaeological investigations in Cochiti Reservoir, Vol. 2: Excavation and methodology of analysis for the 1975 season*, pp. 83-96. Office of Contract Archeology, University of New Mexico, Albuquerque.

Colton, H.S.

1953 Potsherds: an introduction to the study of prehistoric southwestern ceramics and their uses in historic reconstruction. *Bulletin* 25, Museum of Northern Arizona, Flagstaff.

Colton, H.S., and L.L. Hargrave

1937 *Handbook of Northern Arizona pottery wares. Bulletin* 11, Museum of Northern Arizona, Flagstaff, AZ.

Cosgrove, H.S., and C.B. Cosgrove

1932 The Swarts Ruin; a typical Mimbres site in southwestern New Mexico; report of the Mimbres Valley Expedition, seasons of 1924-1927. *Papers of the Peabody Museum of Archaeology and Ethnology* 15(1), Harvard University, Cambridge.

Cowgill, George L.

1975 A section of samplers: Comments on archaeo-statistics. In *Sampling in archaeology*, edited by James W. Mueller, pp. 258-274. University of Arizona Press, Tucson.

Crown, P.L.

1980 Understanding variability in the utility wares in the upper little Colorado region. Paper presented at 45th annual meeting of the Society for American Archaeology, Philadelphia, PA.

1981 The Ceramic Assemblage. In *Prehistory of the St. Johns area, east-central Arizona: The TEP St. Johns Project*, (edited by Deborah A. Westfall). Cultural Resource Division, Arizona State Museum, University of Arizona, Tucson.

Danson, E.B.

1957 An archaeological survey of west central New Mexico and east central Arizona. *Papers of the Peabody Museum of Archaeology and Ethnology* 44(1). Harvard University, Cambridge.

Dick, H.

1965 Bat Cave, Catron County, New Mexico. *School of American Research Monograph* 27, Santa Fe.

Dunnell, R.C., and W.S. Dancey

1983 The siteless survey: A regional scale data collection strategy. In *Advances in archaeological method and theory*, edited by M.B. Schiffer, Vol. 6, pp. 267-287. Academic Press, New York.

Ebert, James I.

1983 Distributional archaeology: Nonsite discovery, recording and spatial analytical methods for application to the surface archaeological record. Ph.D. proposal, Department of Anthropology, University of New Mexico, Albuquerque.

Ebert, J.I., S. Larralde, and L.A. Wandsnider

1983a Distributional archaeology: Survey, mapping and analysis of surface archaeological materials in the Green River Basin, Wyoming. Paper delivered at the 41st Plains Conference, Rapid City, SD.

1984 Predictive modeling: Current abuses of the archaeological record and prospects for explanation. Paper presented at the 49th annual meeting of the Society for American Archaeology, Portland, OR.

Ebert, J.I., T.R. Lyons, B.W. Evan, E.L. Camilli, S. Dennett, D.L. Drager, R. Fanale, N. Hartmann, H. Muessig, and I. Scollar

1983b Archaeology, anthropology and cultural resources management. In *Manual of remote sensing*, Second Edition, edited by J.I. Ebert, and T.R. Lyons, pp. 1233-1304. American Society of Photogrammetry, Falls Church, VA.

Eck, David

1982 Fence Lake coal exploration: An archeological survey on the Hubbell Ranch near Quemado, New Mexico, for Salt River Project. Office of Contract Archeology, University of New Mexico, Albuquerque.

Ellis, Florence H.

1974 Archaeological and ethnologic data: Acoma-Laguna land claims, 1957-59. In *Pueblo Indians II*, edited by David A. Horr. Garland Publishing Company, New York.

Elyea, Janette

1983 Fence Lake coal exploration II: An archeological survey near Quemado, New Mexico, for Salt River Project. Office of Contract Archeology, University of New Mexico, Albuquerque.

1985 The lithic assemblages. In *Prehistoric settlement patterns in west-central New Mexico: The Fence Lake coal lease surveys*, pp. 53-73. Office of Contract Archeology, University of New Mexico, Albuquerque.

Fewkes, Jesse Walter

1891 A few summer ceremonials at Zuni Pueblo. *Journal of American Ethnology and Archaeology* 1.

Fish, Paul

1978 Consistency in archaeological measurement and classification: A pilot study. *American Antiquity* 43:86-88.

Fitzsimmons, J.P.

1959 The structure and geomorphology of west-central New Mexico. In *Guidebook of West-central New Mexico*, pp. 112-1161. Tenth Field Conference, New Mexico Geological Society, Socorro.

Gossett, C.W.

1985 Projectile points as chronological indicators. In *Class II Cultural Resource Survey Upper Gila Supply Study, Central Arizona Project*, edited by R. Chapman, C.W. Gossett, and W.J. Gossett, pp. 104-130. Deuel and Associates, Albuquerque.

Hammack, L.C.

1964 Archaeology of the New Mexico section of the American Telephone and Telegraph communications cable. Report on file with the Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Hargrave, Lyndon L.

1932 Guide to forty pottery types from the Hopi country and the San Francisco Mountains, Arizona. *Bulletin* 1, Museum of Northern Arizona, Flagstaff.

Haury, Emil W.

1936 The Mogollon culture of southwestern New Mexico. *Medallion Papers* 20, Gila Pueblo, Globe Arizona.

1950 *The stratigraphy and archaeology of Ventana Cava, Arizona.* University of Arizona Press, Tucson.

Hogan, Patrick

1983 *A sampling survey of cultural resources on the Fence Lake coal lease near Quemado, New Mexico.* Office of Contract Archeology, University of New Mexico, Albuquerque.

1985 *Prehistoric settlement patterns in west-central New Mexico: the Fence Lake coal lease surveys.* Office of Contract Archeology, University of New Mexico, Albuquerque.

Hogan, Patrick, and Joseph C. Winter

1984 *Economy and interaction along the lower Chaco River.* Office of Contract Archeology, University of New Mexico, Albuquerque.

Holmes, J.

1967 Problems in location sampling. *Annals of the Association of American Geographers* 57:757-780.

Honea, K.

1969 The Rio Grande Complex and the northern Plains. *Plains Anthropologist* 14:57-70.

1976 Early man projectile points in the southwest. *Museum of New Mexico Popular Series Pamphlet*, Santa Fe.

Hough, W.

1919 Exploration of a pit house village at Luna, New Mexico. *U.S. National Museum, Proceedings* Vol. 55:409-431.

Hunter-Anderson, R.L.

1978 *A archaeological survey of the Yellowhouse Dam area.* Office of Contract Archaeology, University of New Mexico, Albuquerque.

Irwin-Williams, Cynthia

1967 Picosa: The elementary southwestern culture. *American Antiquity* 32:441-457.

1968 Archaic culture history in the southwestern United States. *Eastern New Mexico University Contributions in Anthropology* 1:48-54. Portales.

1973 The Oshara tradition: Origins of Anasazi culture. *Eastern New Mexico University Contributions in Anthropology 5.* Portales.

1979 Post-Pleistocene archeology, 7000-2000 B.C. In Southwest, *Handbook of North American Indians*, edited by Alfonso Ortiz. Smithsonian Institution, Washington, DC.

Irwin-Williams, C., and C.V. Haynes, Jr.

1970 Climate change and early population dynamics in the southwestern United States. *Quaternary Research* 1:59-71.

James, Steven E., Ruthann Knudson, Allen E. Kane, and David A. Breternitz

1983 Predicting significance: A management application of high resolution modeling. Paper presented at the 48th annual meeting of the Society for American Archaeology, Pittsburg, PA.

Jefferies, R. W.

1982 Debitage as an indicator of interregional activity diversity in northwest Georgia. *Midcontinental Journal of Archaeology* 7:99-132.

Johnson, W. Ralph

1978 *Soil survey of Catron County, northern part.* United States Department of Agriculture, Soil Conservation Service, U.S. Government Printing Office, Washington, DC.

Jones, G., Thomas, Donald K. Grayson, and Charlotte Beck

1983 Sample size and functional diversity in archaeological assemblages. In Lulu linear punctuated: Essays in honor of George Irving Quimby, edited by R.C. Dunnell and D. K. Grayson, pp. 55-73. *Anthropological Papers*, No. 72, Museum of Anthropology, University of Michigan, Ann Arbor.

Judge, W.J.

1979 Early man: Plains and southwest. In *Handbook of North American Indians*, Volume 3. Smithsonian Institution, Washington, DC.

Judge, W.J., J.I. Ebert, and R.K. Hitchcock

1975 Sampling in regional archaeological survey, In *Sampling in Archaeology*, edited by J.W. Mueller, pp. 82-123. University of Arizona Press, Tucson.

Kayser, David W.

1973 Castle Rock Project: Archeological salvage along State Highway 32 in Agua Fria and Largo Canyons, Catron County, New Mexico. *Laboratory of Anthropology Note* 71, Santa Fe.

1976 An archeological clearance survey and mitigation report for construction stations 482+00 to 501+00 in Catron County, New Mexico. *Laboratory of Anthropology Note* 128, Santa Fe.

Keeley, L.H.

1982 Hafting and retooling: Effects on the archaeological record. *American Antiquity* 47:798-809.

Kelley, Klara B.

1982 *Anasazi and Navajo land use in the McKinley mine area near Gallup, New Mexico, Volume 2: Ethnohistory.* Office of Contract Archeology, University of New Mexico, Albuquerque.

Kelly, Robert L.

1983 Hunter-gatherer mobility strategies. *Journal of Anthropological Research* 39:277-306.

Kemrer, M., and S. Kemrer

1979 A comparative study of Archaic, Anasazi and Spanish Colonial subsistence activities in Cochiti Reservoir. In *Archaeological investigations in Cochiti Reservoir, New Mexico, Vol. 4, Adaptive change in the northern Rio Grande Valley*, edited by J. Biella and R.C. Chapman, pp. 269-282. Office of Contract Archeology, University of New Mexico, Albuquerque.

Kidder, A.V. and S.J. Guernsey

1919 Archeological explorations in northeastern Arizona. *Bulletin* 65, Bureau of American Ethnology, Washington, D.C.

Kincaid, Chris, editor
1983 *Chaco Roads Project, Phase I.* U.S. Bureau of Land Management, New Mexico State Office and Albuquerque District Office, Santa Fe and Albuquerque.

Larralde, S.
1984 Quality control in lithic analysis: A test of precision. *Haliksa'i: UNM Contributions to Anthropology* 3:1-21. Department of Anthropology, University of New Mexico, Albuquerque.

LeBlanc, Steven A.
1980 The Early Pithouse Period. In *An archeological synthesis of southcentral and southwestern New Mexico*, edited by Steven A. LeBlanc and Michael E. Whalen. Office of Contract Archeology, University of New Mexico, Albuquerque.
1982 Temporal change in Mogollon ceramics. In Southwestern Ceramics: A comparative review, edited by Albert H. Schroeder. *The Arizona Archaeologist* 15.

Lekson, S.H.
1984 Great Pueblo Architecture of Chaco Canyon, New Mexico. National Park Service, Publications in Archeology, *Chaco Canyon Studies* 18B, Albuquerque.

Leonard, R.D., F.E. Smiley, and C.M. Cameron
1984 Changing strategies of Anasazi lithic procurement on Black Mesa, Arizona. Paper presented at the 49th Annual Meeting of the Society for American Archaeology, Portland, OR.

Lewarch, D.E., and M.J. O'Brien
1981 The expanding role of surface assemblages in archaeological research. In *Advances in archaeological method and theory*, Vol. 4, edited by M. Schiffer, pp. 294-342. Academic Press, New York.

Longacre, W. A.
1962 Archaeological reconnaissance in eastern Arizona. *Fieldiana: Anthropology* 53:148-167.

McAnany, Patricia A., Jeanne A. Schutt, William Doleman, and Cheryl Wase
1984 Survey data retrieval methods: Intensive surface recording versus sampling. *Haliksa'i: UNM Contributions to Anthropology* 3:105-122. Department of Anthropology, University of New Mexico, Albuquerque.

McGimsey, C.R., III
1951 Peabody Museum Upper Gila Expedition—Pueblo division preliminary report, 1950 season. *El Palacio* 58:299-312.
1980 Mariana Mesa: Seven Prehistoric Settlements in West-Central New Mexico. *Papers of the Peabody Museum of Archaeology and Ethnology* 72. Harvard University, Cambridge.

Magne, Martin P.
1983 Lithics and livelihood: Stone tool technologies of central and southern interior B.C. Unpublished Ph.D. dissertation, University of British Columbia, Vancouver.

Maker, H.J., R.E. Neher, and J.V. Anderson
1972 Soil associations and land classification for irrigation, Catron County. *New Mexico State University Agricultural Experimental Station Report* 229. Las Cruces.

Marshall, Michael P.
1976 Summary of known cultural resources in the Socorro BLM District. Unpublished report on file, School of American Research, Santa Fe.

Marshall, Michael P., John R. Stein, Richard W. Loose, and Judith E. Novotny
1979 *Anasazi communities in the San Juan Basin.* Public Service Company of New Mexico, Albuquerque, and the Historic Preservation Bureau, Santa Fe.

Martin, P.S., and J.B. Rinaldo
1950 Sites of the Reserve Phase: Pine Lawn Valley, Western New Mexico. *Fieldiana: Anthropology* 38(3). Chicago Natural History Museum, Chicago.

Martin, P.S., J.B. Rinaldo, and E.R. Barter
1957 Late Mogollon communities: Four sites of the Tularosa Phase, Western New Mexico. *Fieldiana: Anthropology* 49(1). Chicago Natural History Museum, Chicago.

Martin, P.S., J.B. Rinaldo, E. Bluhm, and H.C. Cutler
1956 Higgens Flat Pueblo, western New Mexico. *Fieldiana: Anthropology* 45. Chicago Natural History Museum, Chicago.

Martin, P.S., J.B. Rinaldo, E. Bluhm, H.C. Cutler, and R. Grange, Jr.
1952 Mogollon Cultural Continuity and Change: The Stratigraphic Analysis of Tularosa and Cordova Caves. *Fieldiana: Anthropology* 40. Chicago Natural History Museum, Chicago.

Martin, P.S., J.B. Rinaldo, W.A. Longacre, C. Cronin, L.G. Freeman, Jr., and J. Schoenwetter
1962 Chapters in the prehistory of eastern Arizona, I. *Fieldiana: Anthropology* 53. Chicago Natural History Museum, Chicago.

Mera, Harry P.
1933 A proposed revision of the Rio Grande glaze paint sequence. *Bulletin* 5, Laboratory of Anthropology Technical Series, Santa Fe.

Moore, Bruce M.
1979 Pueblo isolated small structure sites. Unpublished Ph.D. dissertation, Department of Anthropology, Southern Illinois University, Carbondale.

Moore, Roger, Penelope Whitten, and Patricia Hancock
1983 An archaeological survey of 101 coal exploration drill locations and access routes near Quemado in Catron and Cibola Counties, New Mexico. *Contributions to Anthropology* 786. Division of Conservation Archaeology, San Juan County Museum, Bloomfield, NM.

Museum of New Mexico
n.d. Site forms. On file, Archaeological Records Management System, Laboratory of Anthropology, Santa Fe.
1983 Guidelines for coding ARM site forms. Archeological Records Management Project, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Nelson, Margaret C.
1980 The Archaic of southern New Mexico. In *An archeological synthesis of south-central and southwestern New Mexico*, edited by Steven A. LeBlanc and Michael E. Whalen, pp. 63-102. Office of Contract Archeology, University of New Mexico, Albuquerque.
1983 Site content and structure: Quarries and workshops in the Maya highlands. Manuscript in files of the author, Department of Anthropology, State University of New York, Buffalo.

Nelson, Margaret C., and Eileen L. Camilli
1984 The relationship between prehistoric technological organization and land use. Paper presented at the 49th Annual Meeting of the Society for American Archaeology, Portland, OR.

Newcomer, M.H., and G deG. Sieveking
1980 Experimental flake scatter patterns: A new interpretative technique. *Journal of Field Archaeology* 7:345-352.

O'Brien, Michael J., Roger D. Mason, Dennis E. Lewarch, and James A. Neely
1982 *A late formative irrigation settlement below Monte Alban: Survey and excavation on the Zozocotlan Piedmont, Oaxaca, Mexico.* Institute of Latin American Studies, University of Texas, Austin.

Phagan, Carl
1982 Report on the nature of the Dolores Archaeological Project Archaic expression. Memorandum on file, Dolores Archaeological Project, Dolores, CO.

Pielou, E.C.
1975 *Ecological Diversity.* Wiley and Sons, New York.

Plog, Fred
1968 Archaeological survey: a new perspective. Unpublished M.A. thesis, University of Chicago.

Plog, Fred, Stephen Plog, and Walter Wait
1978 Decision making in modern surveys. In *Advances in archaeological method and theory*, Vol. 1, edited by M. B. Schiffer, pp. 383-421. Academic Press, New York.

Pokotylo, David L.
1978 Lithic technology and settlement patterns in Upper Hat Creek Valley, B.C. Unpublished Ph.D. dissertation, University of British Columbia, Vancouver.

Powell, Shirley L.
1980 Material culture and behavior: A prehistoric example for the American Southwest. Ph.D. dissertation, Department of Anthropology, Arizona State University, Tempe.

Raab, C.M., R. Cande, and D. Stahle
1979 Debitage graphs and archaic settlement patterns in the Arkansas Ozarks. *Midcontinental Journal of Archaeology* 4:167-182.

Renfrew, C., J.E. Dixon, and J.R. Cann
1968 Further analysis of Near Eastern obsidian. *Proceedings of the Prehistoric Society* 34:319-331.

Rinaldo,John B., and Elaine A. Bluhm
1956 Late Mogollon pottery types of the Reserve area. *Fieldiana Anthropology* 36(7). Chicago Natural History Museum, Chicago.

Ruppe, R.J., and A.E. Dittert Jr.
1952 The archaeology of Cebolleta Mesa and Acoma Pueblo: a preliminary report based on further investigation. *El Palacio* 59(7):191-217.
1953 Acoma archaeology: a preliminary report of the first season in the Cebolleta Mesa region, New Mexico. *El Palacio* 60(7):259-273.

Sarle, W.S.
1982 Introduction to SAS clustering procedure. In *Statistical analysis system user's guide: Statistics* (1982 edition), pp. 418-422. SAS Institute Inc., Carey, NC.

Sayles, E.B.
1983 The Cochise cultural sequence in Southwestern Arizona. *Anthropological Papers* 42, University of Arizona, Tucson.

Sayles, E.B., and E. Antevs
1941 The Cochise Culture. *Medallion Papers* 29. Gila Pueblo, Globe, AZ.

Schiffer, Michael B.
1976 *Behavioral archaeology.* Academic Press, New York.
1983 Toward the identification of formation processes. *American Antiquity* 48:675-706.

Schiffer, Michael B., Alan P. Sullivan, and Timothy C. Klinger
1978 The design of archaeological surveys. *World Archaeology* 10:1-28.

Sebastian, Lynne
1983 Anasazi site typology. In *Economy and interaction along the lower Chaco River: The Navajo Mine Archeological Program*, edited by Patrick Hogan and Joseph C. Winter, pp.403-419. Office of Contract Archeology and Maxwell Museum of Anthropology, University of New Mexico, Albuquerque.

Sidrys, R.
1977 Mass-distance measures for the Maya obsidian trade. In *Exchange systems in Prehistory*, edited by T.K. Earle and J.E. Ericson, pp. 91-108. Academic Press, New York.

Smith, W.
1971 Painted ceramics of the western mound at Awatovi. *Papers of the Peabody Museum of Archaeology and Ethnology* 38, Reports of the Awatovi Expedition No. 8. Harvard University, Cambridge.
1973 The Williams Site, a frontier Mogollon village in west-central New Mexico. *Papers of the Peabody Museum of Archaeology and Ethnology* 39(2). Harvard University, Cambridge.

Sokal, Robert R., and Peter H. A. Sneath
1963 *Principles of numerical taxonomy.* W.H. Freeman and Company, San Francisco.

Stahle, David W., and James E. Dunn
1982 An analysis and application of the size distribution of waste flakes from the manufacture of bifacial stone tools. *World Archaeology* 14:84-97.

Stiger, Mark
1983 Technological organization and spatial structure in the archaeological record. Ph.D. dissertation proposal, Department of Anthropology, University of New Mexico, Albuquerque.

Stiles, D.N., R.L. Hay, and J.R. O'Neil
1974 The MNK Chert Factory Site, Olduvai Gorge, Tanzania. *World Archaeology* 14:84-97.

Stuart, D.E., and R.P. Gauthier
1981 *Prehistoric New Mexico: Background for survey.* New Mexico Historic Preservation Bureau, Santa Fe.

Tainter, J.A., and D. Gillio
1980 *Cultural resources overview, Mt. Taylor Area, New Mexico.* U.S. Government Printing Office, Washington DC.

Taylor, Peter J.
1977 *Quantitative methods in geography.* Houghton Mifflin Company, Boston.

Thomas, David H.
1976 *Figuring Anthropology.* Holt, Rinehart and Winston, San Francisco.
1983 The archaeology of Monitor Valley. Vol. 2, Gatecliff Shelter. *American Museum of Natural History Anthropological Papers* 59(1).

Thomas, David H., and Susan L. Bierwirth
1983 Material culture of Gatecliff Shelter: Additional stone tools. In The Archqeology of Monitor Valley, Vol. 2, Gatecliff Shelter, edited by D. H. Thomas. *American Museum of Natural History Anthropological Papers* 59(1).

Titiev, Mischa
1937 A Hopi salt expedition. *American Anthropologist* 39:244-258.

Tuan, Yi-Fu, C.E. Everard, J.G. Widdison, and I. Bennett
1973 *The climate of New Mexico.* Revised Edition. State Planning Office, Santa Fe.

Underhill, Ruth M.
1956 *The Navajos.* University of Oklahoma Press, Norman.
1979 *Papago.* Holt, Rinehart and Winston, San Francisco.

United States Department of the Interior, Bureau of Land Management
1979 Site descriptions from Quemado planning unit class II inventory survey. Socorro Resource Area, Socorro, NM.
1982a Draft Environmental Impact Statement, West Socorro Rangeland Management Program. Socorro Resource Area, Socorro, NM.
1982b Final Environmental Impact Statement, West Socorro Rangeland Management Program. Socorro Resource Area, Socorro, NM.
1984 San Augustine Coal Area Management Framework Plan Amendment/ Environmental Assessment (MFPA/EA). Socorro Resource Area, Socorro, NM.

Vierra, Bradley J.
1981 A summary and comparison of the excavated Archaic and Anasazi sites. In *Human Adaptations in a Marginal Environment: The UII Mitigation Project*, edited by J.C. Moore, and J.C. Winter, pp. 382-389. Office of Contract Archeology, University of New Mexico, Albuquerque.

Vierra, Bradley J., and William H. Doleman
1984 Organization of the southwestern Archaic settlement-subsistence system. Paper presented at the 49th annual meeting of the Society for American Archaeology, Portland, OR.

Vivian, Gordon, and Paul Reiter
1960 The great kivas of Chaco Canyon and their relationships. *School of American Research and the Museum of New Mexico Monograph* 22. Santa Fe.

Wandsnider, LuAnn
1983 Assessing the impact of select geomorophological processes on the integrity of the archaeological record. Ph.D. proposal, Department of Anthropology, University of New Mexico, Albuquerque.

Wandsnider, LuAnn, and James I. Ebert
1984 Accuracy in archaeological surface survey in the Seedskadee Project Area, southwestern Wyoming. *Haliksa'i: UNM Contributions to Anthropology* 3:9-21. Department of Anthropology, University of New Mexico, Albuquerque.

Wandsnider, LuAnn, and Signa Larralde
1984 Seedskadee Cultural Resource Assessment Project: Report to the Branch of Remote Sensing, National Park Service, Albuquerque. On file with the National Park Service, Southwest Cultural Resources Center, Santa Fe.

Warren, Helene
1971 Notes on lithic sources in Catron County, New Mexico. On file at the Laboratory of Anthropology, Santa Fe.

Wasley, W.W.
1959 Cultural implications of style trends in Southwest prehistoric pottery: Basketmaker II - Pueblo II in west-central New Mexico. Ph.D. dissertation, University of Arizona, Tucson.

Westfall, D.A.
1981 Prehistory of the St. Johns Area, east-central Arizona: The TEP St. Johns Project. *University of Arizona Archaeological Series* 153, Cultural Resource Management Division, Arizona State Museum, Tucson.

Whalen, Michael E.
1979 Social organization and interaction during the pithouse period in the Jornada area. In *Jornada Mogollon Archeology*, edited by P. Beckett and R. Wiseman, pp. 345-358. New Mexico State University, Las Cruces.

Wilson, J.P.
1972 Archaeological survey of Route 1-A right-of-way between Zuni Indian Reservation and Apache National Forest, Valencia and Catron Counties, New Mexico. (LA 3984-4038). Report on file, Museum of New Mexico, Laboratory of Anthropology, Santa Fe.

Wilson, J.P. (Continued)

1976 Archaeological reconnaissance of a proposed Tucson Gas and Electric Company transmission line corridor in western New Mexico. *Tucson Gas and Electric Company Report* 4.

1978 Cultural resources on state trust lands crossed by three utility corridors, Catron County, New Mexico and Apache County, Arizona. *Tucson Gas and Electric Company Report* 14.

Windes, Thomas C.

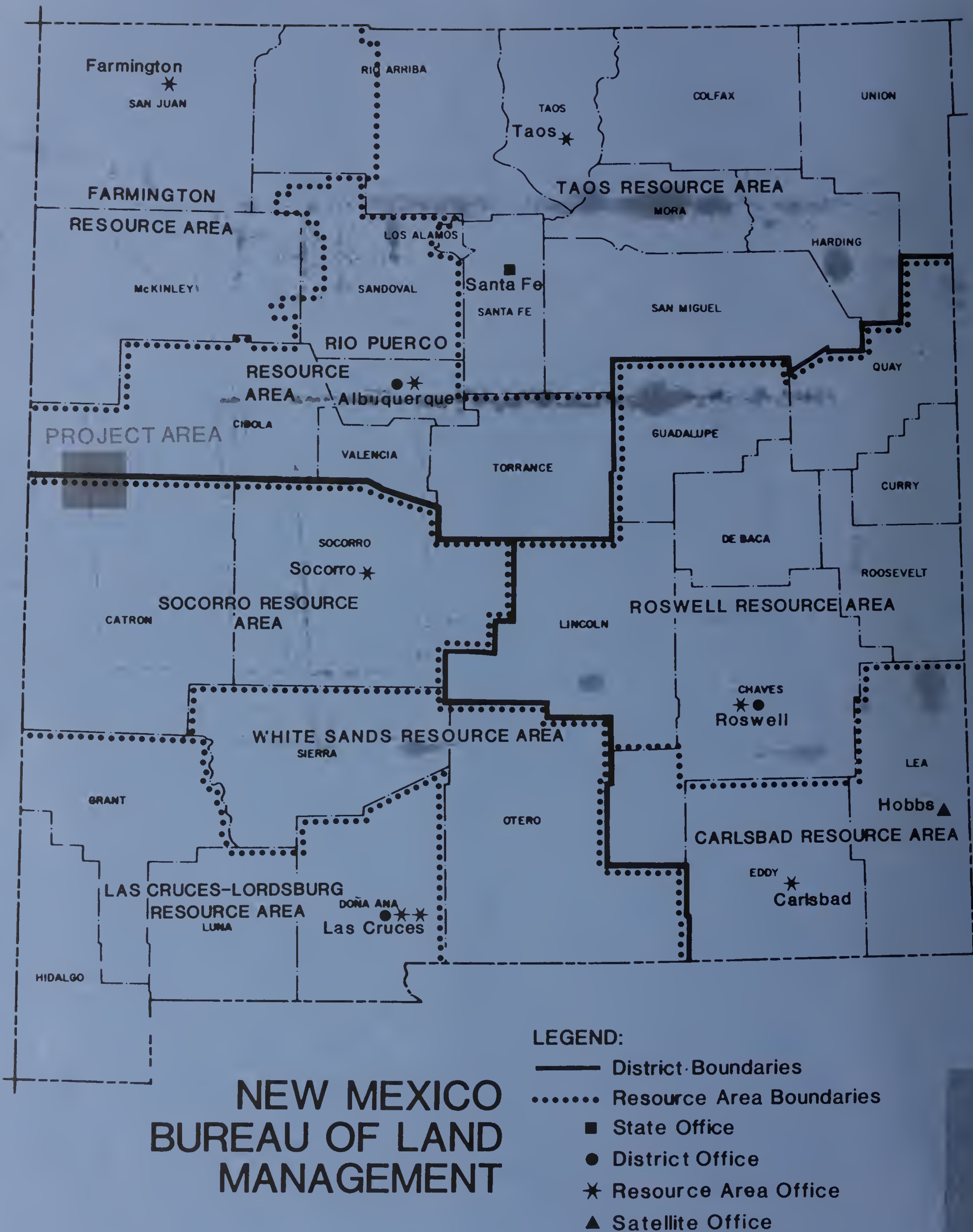
1977 Typology and technology of Anasazi ceramics, in *Settlement and Subsistence along the Lower Chaco River: The CGP Survey*, edited by Charles A. Reher, pp. 279-370. University of New Mexico Press, Albuqeurque.

Winkler, J.

1961 Wetherill Mesa Project: Archaeological survey in Socorro and McKinley Counties, New Mexico. Site records and field journal. Manuscript on file, Laboratory of Anthropology, Museum of New Mexico, Santa Fe.

Yellen, J.E.

1977 *Archaeological approaches to the present.* Academic Press, New York.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